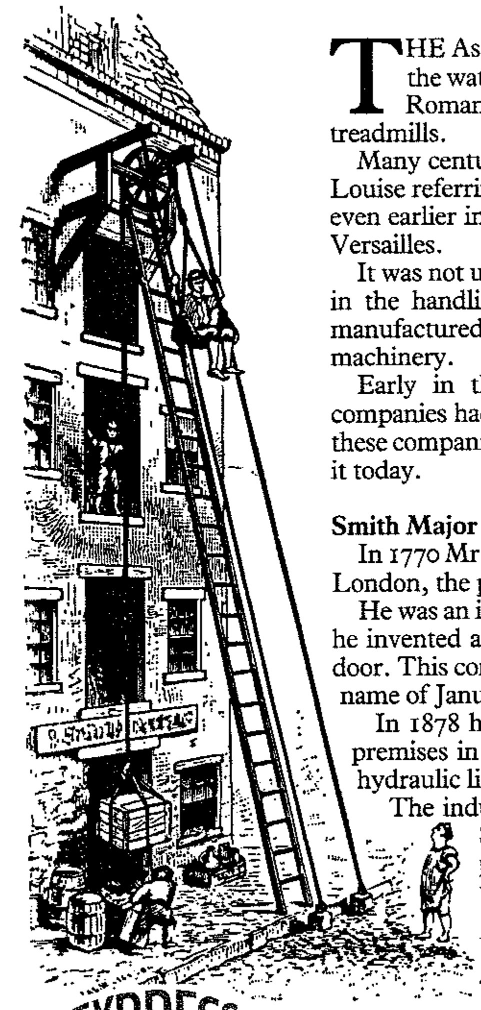
The Express Lift Company Limited

1770-1982

A Brief History of the Express Lift Company Ltd.

Introduction



THE Assyrians and the Egyptians used pulleys and buckets to distribute the waters of the Babylon and the Nile for irrigation. Later the Greeks, Romans and the Chinese used continuous buckets on a wheel driven by treadmills.

Many centuries later Napoleon wrote to his wife, the Arch-Duchess Marie Louise referring to a 'flying chair'. Such a device is said to have been installed even earlier in Windsor Castle for Queen Anne to match that at the Palace of Versailles.

It was not until 1850 or thereabouts that lifts began to play a significant part in the handling of goods and passengers in buildings. They were mostly manufactured by general engineers and driven by belts through the main plant machinery.

Early in the 20th century at least three British general engineering companies had begun to specialise in the manufacture of electric lifts. Two of these companies led to the foundation of The Express Lift Co. Ltd. as we know it today.

Smith Major & Stevens

In 1770 Mr Smith founded a small engineering business at 69 Princes Street, London, the present site of the Prince of Wales Theatre.

He was an ironmonger of considerable inventive talent. Among other things he invented an early door spring or closer for locating in the floor under the door. This continued in manufacture right up to 15 years ago under the brand name of Janus, the name of the 'new' Battersea factory.

In 1878 his successors joined with Archibald Smith & Stevens with new premises in Battersea, the JANUS Works. They made hand powered and hydraulic lifts and rope stranding machines.

The industrial revolution was a time of rapid change. It was Archibald Smith who invented the vee groove rope drive for winding purposes as the British Patent 447 bears witness. The application to lifts with steel ropes followed in 1884.

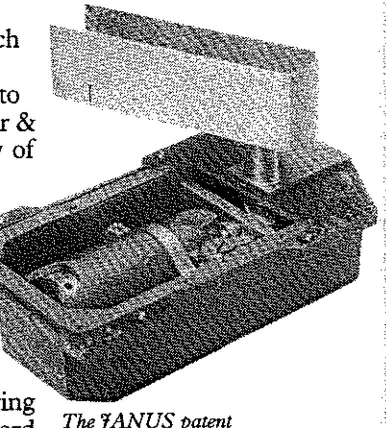
A catalogue of Archibald Smith & Stevens dated 1880 listed by name 126 hydraulic installations, 26 belt lifts and over 400 hand operated lifts, which had been built by the Company.

In addition it mentions over 1000 other lifts the Company had in service. In 1882 Archibald Smith & Stevens produced a special hotel lift traction unit and by 1888 the Company were designing carriage lifts which were considered unique and a forerunner of the motorcar lift.

By 1895 traction drive had almost replaced the drum drive system which was becoming clumsy as building height increased.

In 1909 another brilliant engineer, Mr Charles Major was promoted to become a Partner of Archibald Smith & Stevens, and the firm Smith Major & Stevens was founded and at once planned a 'new factory' in the County of Northamptonshire to replace the old JANUS Works in London.

SMS completed a number of ship installations engineered largely by P. H. Stevens. It was Mr Stevens who invented the tennis ball testing equipment in 1924, which has been used throughout the world until modern times and remains in service at the All England Club, Wimbledon.



The JANUS patent door closer.

Easton Lift Co.

In 1822 an engineer named Josiah Easton founded his own engineering company. He had first partnered Richard Waygood the founder of Richard Waygood & Co., but two such dynamic entrepreneurs were not long able to work together. They dissolved their partnership to start separate businesses, each of which has had tremendous influence on the lift business in this country and the world. First came Easton & Amos in the Strand, London, utilising patents bought from the Montgolfier Brothers of France to make hydraulic rams.

Josiah Easton then joined with Mr Anderson and later Mr Goulden. They designed and made anything connected with hydraulics, but soon started to make use of the new source of power, electricity! Notable at this time was their installation of 100 person lifts travelling 90ft for the Mersey Underground Railway.

In 1903 the Easton Lift Co. was installing the first lifts in the Greenwich and Woolwich Tunnels under the Thames, and their faceplate controllers were not to be replaced until 1933 to the then modern camshaft systems. These lifts had 64 brake horsepower motors rack driven on 5ft pulleys carrying 60 and 40 persons. By 1910 they had installed some 35 lifts of 100 person capacity for the underground railways, at the time the largest lifts in the world.

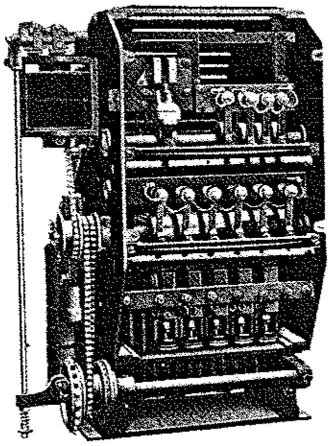
Mr Charles Major.

During the First World War much of their work was concerned with the supply of ships' hoists and derricks, hydraulic ramps and small lifts for HMS Neptune, Monarch, Conqueror, Thunderer; well-known names in England's maritime history. The electrical drives were supplied by GEC, the main contractor.

Between the Wars GEC – The Easton Lift Co.

In 1917 The Express Lift Company Ltd was formed by the Easton Lift Company and The General Electric Company. Their joint interest had evolved during their industrial efforts in the production of munitions and materials of war. It was on the outbreak of war that the Admiralty placed large contracts with GEC and started their involvement with electrical hoists. It is interesting that during this period 'Bill' Huggett worked on asdics and Naval engineering with Dr A. H. Railing, later to become Sir Harry Railing and Chairman of GEC and The Express Lift Company Ltd.

Design and Engineering ability were at a premium and no scheme or development was too difficult to tackle. Industry was expanding – buildings were taller, lifts faster. Modern safety gears were replacing old gravity type safeties and by 1920 cam shaft control systems were being introduced, although engineers like C. G. Major still argued the safety of the old systems.

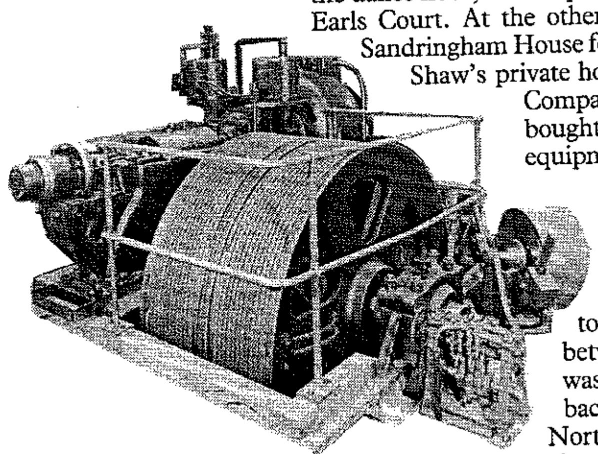


S.M.S. Truelevel control gear with cover removed.

Single phase AC lifts with 25 or 50 cycle supplies were common as were 2 phase – 3 wire supplies direct from the National Supply Grid. Single phase equipment was supplied in Newcastle – right up to 1955. Manually operated switch gear for controlling the lift from the car was about to be superseded by the ordinary push button control widely introduced in 1910-12, although the first installation was in 1902. During this period the levelling of lifts up to speeds of 500 fpm had relied upon the skill of the lift attendant and his car switch. Push button controls and the human element of strikes finally saw the end of the Lift Car Operator or 'Bell Hop' in the mid 1950s and full acceptance of fully automatic controls.

In November 1925 Express introduced the gearless self-levelling lift, the first time lifts had truly run 'into floor'. This was designed as a specific requirement to obviate an Otis patent, an interesting glimpse of the Company's ready acceptance of engineering challenge.

In 1929 the Company achieved a special engineering first at the Savoy Hotel in London by installing hydraulic equipment to raise and lower the whole of the dance floor, to be repeated 10 years later in the swimming pool platform at Earls Court. At the other end of the scale a personal lift was installed in Sandringham House for King Edward VII and another in George Bernard Shaw's private house in Ayot St. Lawrence. During this period the Company started installing Ward Leonard equipment bought from Westinghouse of America under licence. This equipment was soon to be produced in Northampton by Smith Major & Stevens, the first British manufacturer of gearless lifts.



The hoisting machine of the lift at Woolwich Tunnel prior to reconstruction.

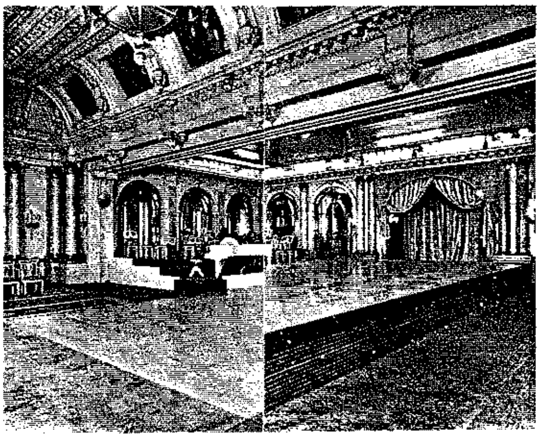
With all these new innovations and faced with a rapidly expanding world market it was natural for two of the leading companies of the day to come together. Mergers had first been discussed in 1928 between Waygood-Otis and the SMS Company. But it was SMS and The Express Lift Co. Ltd with GEC backing who finally agreed to merge in 1930. Northampton became the administrative centre of the new Company – the largest British controlled lift manufacturing company. The Westinghouse Licence Agreement for the exchange of patents and manufacturing know-how was retained.

The Express Lift Company Ltd.

The early 30s were an era of consolidation for the Company. Planning the way forward fell to such memorable characters as J. A. Phelps, Managing Director, J. J. Lewis with his bowler hat and brolly, J. Wilkins and Bill Cove in London, Teddy Hall and Bill Hepple in Northampton, George Cherry, Bert Wiggett and Bill Dixie on the engineering side. Dick Osborne who had come in from British Thompson Houston at Rugby and was later to form and run the Service Department as a separate entity. Mr A. G. Poulson and Mr George Cherry, two senior engineers, were both ultimately to leave to give backing and drive to Jenson Lifts and Evans Lifts, whilst Mr E. W. Wood left to become the Chief Engineer of Wadsworth Lift Co. A process which has continued right up to the present day with Edward Kruger going to Bennie Lift Co., Keith Parkin to Hammond & Champness and J. O. Trundle to Otis.

In 1932 the Company installed their first escalators in the Earls Court Exhibition Centre, London. They were of Westinghouse design but like the Ward Leonard equipment a few years previously were soon to be manufactured at the Northampton Works.

In 1931/4 came the introduction of the low voltage controller. The 40 volt telephone type control equipment replacing the old floor setters by inductors and screw type door closers with harmonic door closers. In 1935 the introduction of Slip Ring VV power controls led to the development of the eddy current braking systems still in use by some companies.



The dance floor at the Savoy Hotel (raised and lowered).

In 1935 GEC acquired the whole of the share capital ensuring the use of the GEC worldwide outlets for lifts and financial backing for further expansion and development.

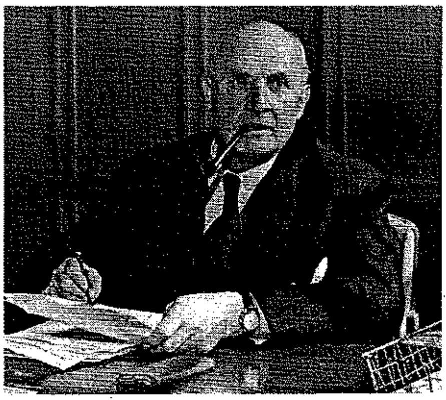
In 1936 V. H. C. Amberg, who was Head of GEC Telephone Manufacturing Company Coventry, was asked by Lord Hirst to take over the running of Express Lifts. In recognition of his efforts 'VA' was appointed an Associate Director of GEC in 1964.

The rebuilding of the Company under 'VA' in no way interrupted the flow of engineering development and regenerated a great deal of work for large corporations like Imperial Tobacco and John Lewis stores.

By 1939 Ron Stevens with his electrical and radio fanaticism was leading the Company towards a further change in lift controls. These were developed and perfected by S. T. Hunt, later to be the Chief Engineer, and finally Engineering Director, who introduced the floor selector and relay control system that was to create a new era of reliability and speed.

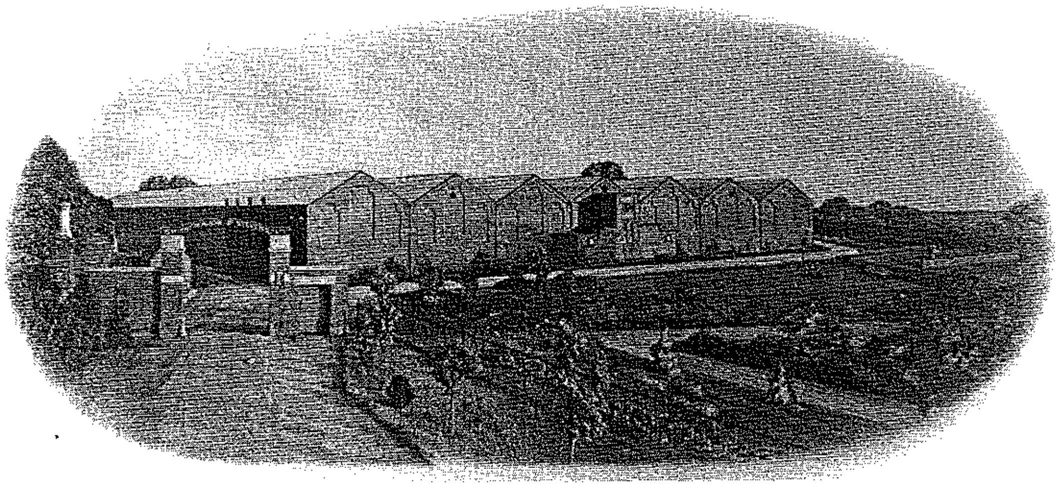
After the 1939/45 war the Company made its first priority the design of reliable equipment at the bottom end of the market for multistorey housing associations springing up due to war devastation.

Large cities like London, Plymouth, Manchester and Coventry, created a totally new market. Land was valuable so blocks varied from 10 floors through to 22 and even higher. The Company evolved a specification and design to become the standard throughout the UK. Production reached a maximum of 630 identical lifts in one year, and the Company went on to manufacture and install many thousands of flats lifts up to 1968. It is interesting to note that at the height of the post war boom the Company received a postcard inviting them to tender for 1000 lifts from a Mr K. Wood, at that time unknown, later to lead the Bison Floor Slab Company constructing 'industrialised' flat blocks.



Mr V. H. C. Amberg

In June 1950 the Company restarted its own house magazine called the 'Contactor'. This was a follow-up of an earlier magazine 'Service' which had been so popular in the late twenties. 1950 also saw the launching of the new Apprentice Association that was to be the breeding ground of many of our later engineers, senior managers, and directors. It was also the year of expansion in South Africa with the purchase of the Premier Lift Company, and Express installed the first postwar gearless lifts in South Africa at the Grand Hotel in Cape Town. Our long association with South Africa is shown by a tender dated 1929 for the complete supply and installation of a 300 ft per minute Passenger lift for Sun Insurance, price £697!

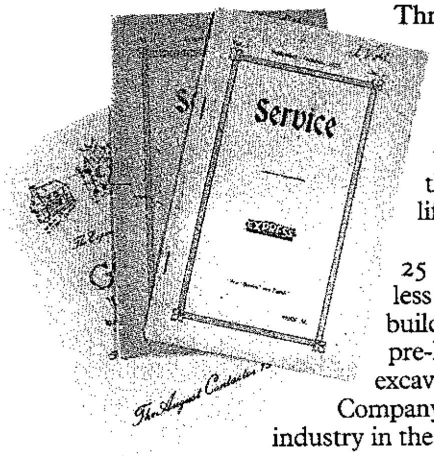


Abbey Works, Northampton, circa 1913.

1950 saw the completion of Liverpool Cathedral started in 1940, but delayed through the war and finance. Express installed a hydraulic lift to bring chairs from the crypt to the nave, lifting up the marble slabs in the nave at the same time as the 250 chairs arrived at ground level.

August 1955 saw the reconstruction of the Woolwich and Greenwich tunnel lifts installed in 1903 and already reconstructed in 1933, this time with 80 hp Ward Leonard sets.

The Company continued to find export markets and installed the lifts in the tallest building in Southern India, the United Indian Fire & General Insurance Company in Madras. Orders were received from Salisbury Rhodesia and Takoradi Harbour in Ghana, where the Company installed 12 heavy goods lifts in dockside warehouses.



Some old house magazines.

Through the 50s and 60s engineering development continued to be a major Company strength. In this period the Company introduced rectifiers to replace the troublesome excitors. In the office market the Company was soon to lead the industry with new group control systems. It was at this time that the Company received the Royal Warrant posted in the London Gazette in December 1959 for the Sandringham lift installation.

In May 1960 the Company completed an installation of 25 lifts, 17 at Bucklesbury House and 8 at Temple House. No less than 16 were high speed lifts. The erection of the latter building had been delayed whilst archaeologists excavated the pre-Roman Mithras Temple uncovered by the foundation excavations. These Express group traffic systems were to last the Company some 20 years until integrated circuits appeared in the lift industry in the 70s.

But time was passing and with it an era. Many of the employees who had helped to weld the two companies together were passing on their way. C. C. Kitchen and William Pullen who had both joined Archibald Smith & Stevens in the 1880s retired after 57 and 60 years' service respectively. Other well known characters were G. L. Davies, Charles Russell, Miss Phoenix who had joined Express Lifts in 1915 in Liverpool all retired in April 1951. But the new wave were continuing to make their mark when S. T. Hunt was awarded the OBE in 1975.

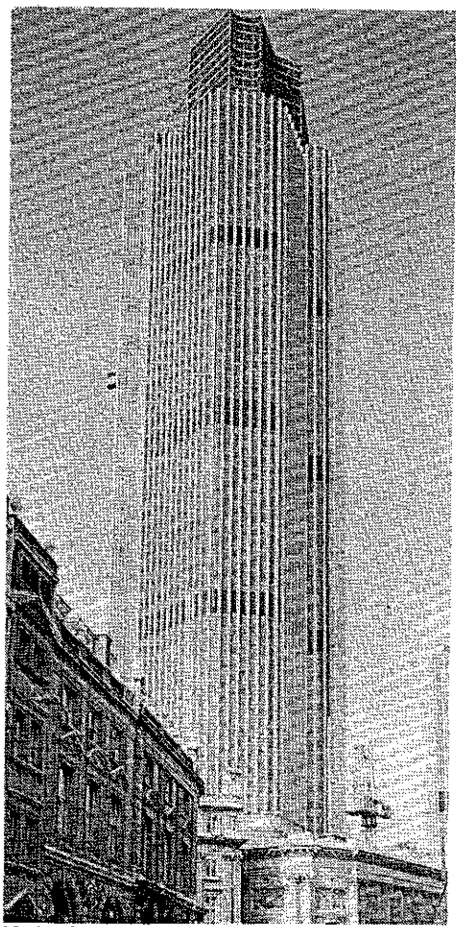
Engineering skills, carefully nurtured through extensive training of apprentices and University graduates, still predominate and motivate the Company. Express pursued solid state controls in common with many Companies but in 1978 launched the first microprocessor group control system at the Marks & Spencer headquarters in London. Nearby the Company was busy completing 22 high speed lifts, five of them double deckers at 1400 ft per minute, in Europe's tallest office block, the Natwest Tower. These achievements, typical of events throughout the Company's long history, were winning many commercial advantages. Substantial corporations long used to accepting American dominance of the elevator market were buying British in large numbers. But development is not just technical advance. Express have always prided themselves on supplying reliability and safety. These twin objectives which are being improved upon yet again by the 'processor era' are enshrined in the following extracts taken from 1910 and 1913 catalogue of Smith Major & Stevens.

"The reliability of a lift installation is a matter of such importance that a choice should only be made after the most careful and painstaking consideration. The particular service conditions should be studied from all aspects, and instant, unfailing operation at any and all times should be the ideal. Absolute safety in all circumstances should be most rigidly and uncompromisingly insisted upon, and no safety appliance which has not proved its efficiency in actual service should be taken on trust."

"NOT A CATALOGUE – Don't Burn before Reading."

"Afterwards we aspire to raise your thoughts to higher ideals, that later we may lift yourselves."

But development both of a Company and its products does not end. Express have just completed the construction of the world's tallest Test Tower at 418 ft (127.25 m). Development and Research now employs 49 engineers. The largest number ever.



National Westminster Tower, London

The Express Lift Company Limit
Abbey Works,
Northampton
showing recently completed Test Tower.

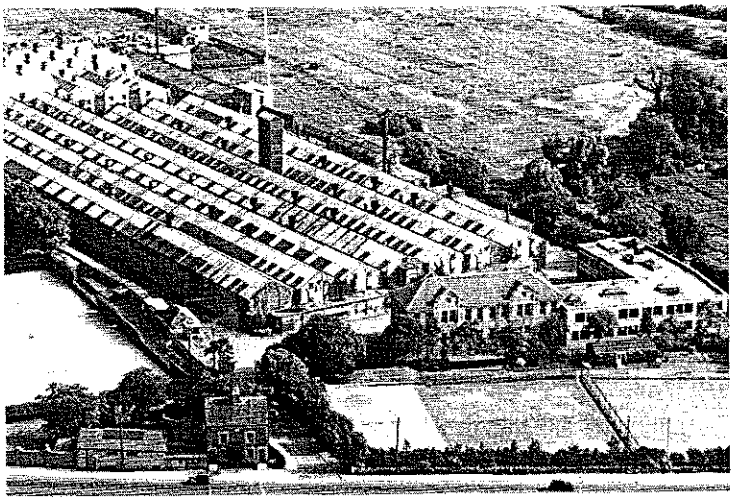
The Tower

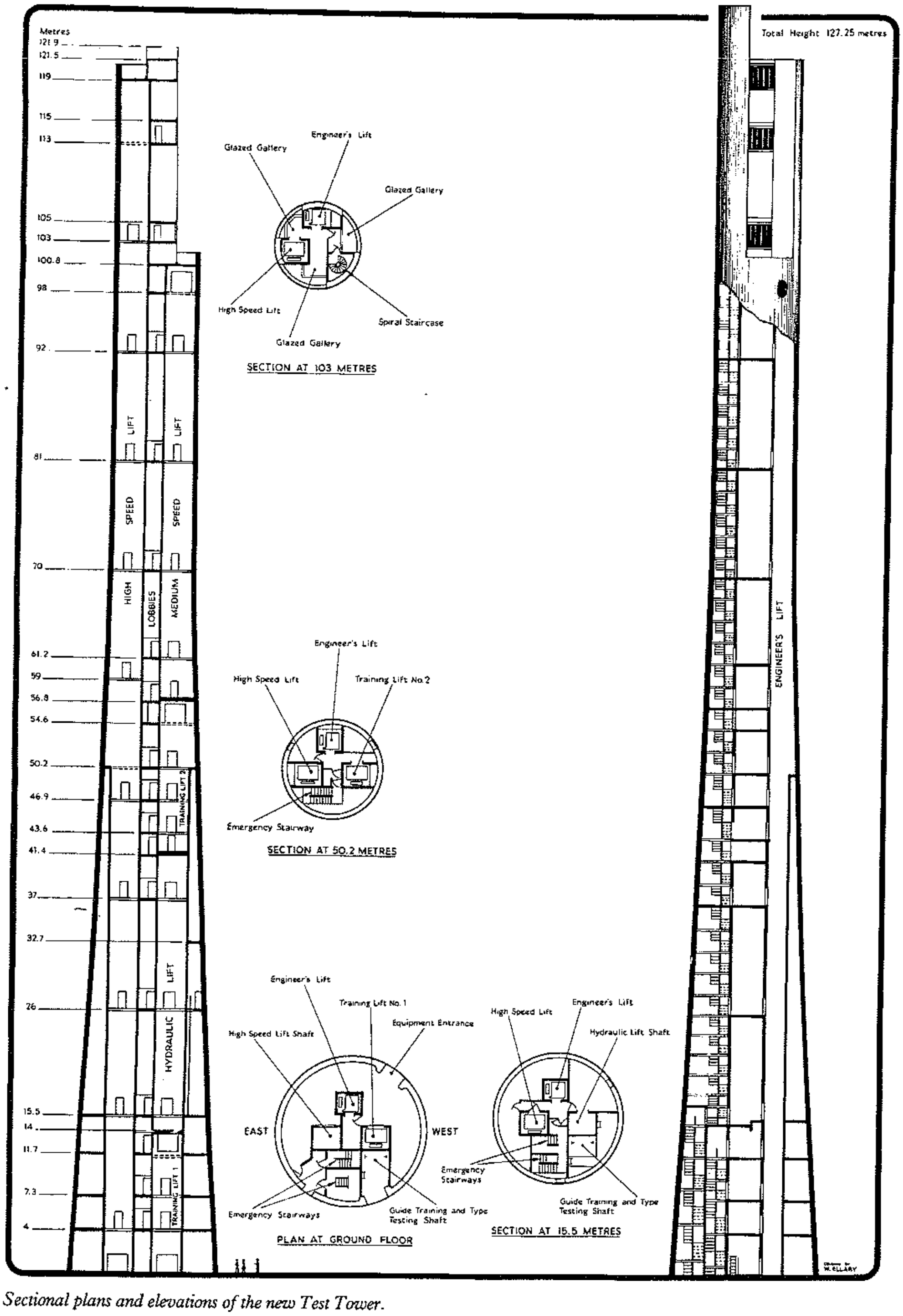
AS the manufacture of lifts continued to expand in the new factory at Abbey Works, built by Smith, Major & Stevens in 1909, product development was also proceeding. It became increasingly evident that improved testing and proving facilities were required, and in 1932 it was decided to erect a test tower. This 60′ high tower was built in the middle of the Works and through the factory roof, and has been in use continuously ever since, a veritable workhorse. For the past 50 years, all types of lifts, from simple single speed at 100 fpm through to high speed gearless lifts at 500 fpm, have been developed and tested with the aid of this tower.

In the intervening years, several studies were made with a view to improving the original test tower facilities, none of which went further than the drawing board. It was in the late 70s, with new technologies including silicon devices moving at an ever increasing rate, that it became very evident that lift technology itself would be taking on a new form. The urgent need for a more sophisticated test facility became more and more obvious to our engineers, as an important extension to their own laboratories and those of GEC at Wembley and Stafford.

And so the new Test Tower was conceived.

Earlier aerial view of Abbey works, showing the old Test Tower.





Sectional plans and elevations of the new Test Tower.

Feasibility studies were carried out against a general specification of the Tower having to provide a

High speed lift
Medium speed lift
Hydraulic lift
Engineers' service lift
Training shaft
Type test shaft
Staircase

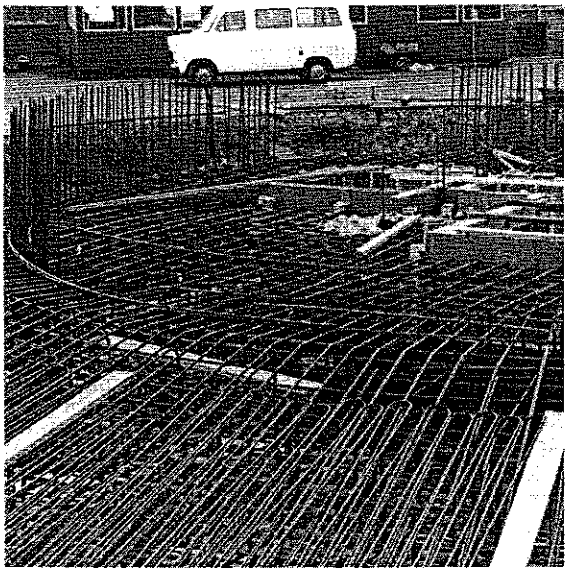
The life of the Tower was to be 25/40 years and the structural design should permit sway not exceeding that normal for a building of this height with lifts. If the structure should vibrate, it should not be within the range 5-15 cycles per second.

In 1980 the overall design was confirmed giving excellent facilities for the Research and Development Team for the foreseeable future. The design allows for at least six testing facilities, a general purpose access lift and several complete floors for laboratory use.

The Engineers' Lift

This 8 person lift provides facilities for Engineers to travel throughout the Tower and enables small equipment to be transported to and from various levels.

Having a travel of 113 metres, serving 19 levels, it operates at a speed of 1.6 m/s. It has microprocessor based power and control equipment.



The first steelwork for the tower walls. Vertical steelwork is anchored at the base of the whole structure.

High Speed Shaft

This shaft of 120 m approximate length provides a facility for testing lifts up to 10.0 metres per second. (2000 feet per minute).

It has an actual lift travel of almost 100 metres but only serves three levels at 4, 98 and 103 metres. The pit is let into the Tower foundations some 2.3 metres. The machine room is at level 113.

Initially the shaft will accommodate a 16 person capacity lift running at a speed of 6.0 m/s for the development of a microprocessor based drive system for high speed gearless lifts.

The Third Shaft

This shaft provides four entirely independent lift facilities in a novel manner by dividing the shaft into four separate sections over its height, as detailed below:

Training Shafts

The first and third sections of shaft, each of approximately 15 metres height, provide two separate facilities for training Company personnel in installation and servicing techniques. They are an adjunct to the Training Centre.

The lower shaft has at its lowest level a completely open front facing a large roller-shutter entrance into the Tower. This will allow completely assembled lift cars to be manoeuvred into the Tower and Training Shaft.

Both shafts serve three floors over seven metres of travel.

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Hydraulic Shaft

This is situated between the two Training Shafts between levels 14 and 41, thereby giving a 27 metre facility which is more than adequate for both Direct Acting and roped Indirect Acting types of hydraulic lift.

Jacks can be manoeuvred into the shaft via a long door in the rear wall into the type testing shaft behind.

The machine room is at level 15.

Medium Speed Shaft

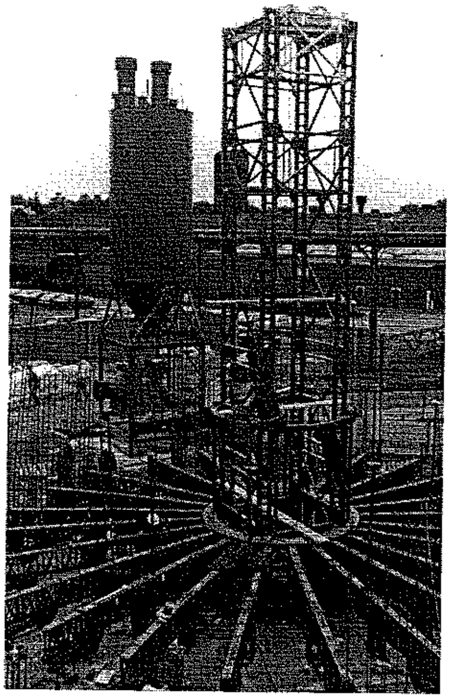
This facility, which provides for the development of geared and gearless systems, is situated above the second training shaft.

The shaft, running from levels 57 to 100 approximately, gives a travel of 30 metres and is suitable for lift speeds up to 2.5 metres per second.

Staircase

An emergency staircase of chequer plate construction runs the full height of the Tower and feeds not only the various lift pits and machine rooms together with individual lift landing entrances, but emergency exits which, at various heights, are fitted into the medium speed and high speed shafts. The Engineers' Lift also serves the emergency exit points.

The top section of staircase takes on a spiral form being contained in the tallest of the three 'tubes' protruding above level 100. These are the tubes that give the Tower its individual and distinctive appearance. The staircase is lit by natural daylight and electric lighting but, additionally, has at every few metres stand-by emergency lighting.



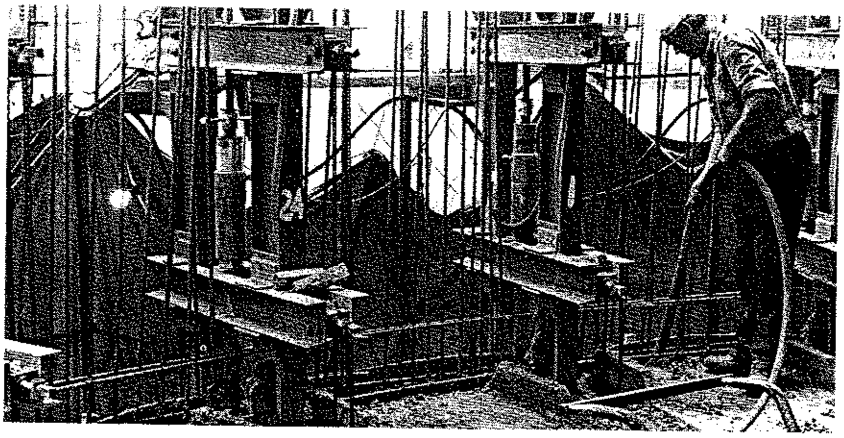
Slip-form rig construction in progress.

Type Test Shaft

At the rear of the multi-task third shaft, for a height of 32 metres, is a separate shaft. This facility will allow the dynamic testing of lift items such as buffers and safety gears and will be available for use by all lift manufacturers.

Its access is through a separate entrance at ground level and, to all intents and purposes, is a separate entity. Within it is a vertical cat ladder serving chequer plate galleries. Additional access is from levels 12 and 26, served by the Engineers' lift.

When not being used for component type testing, this shaft will be used as an additional facility.



Two of the twenty four 4 ton hydraulic jacks.

Laboratory

Excluding the ground floor, there are three levels (at 4.0, 7.3 and 11.7) for laboratory purposes. In addition to the Engineers' Lift serving them, access is via an entirely separate staircase.

Natural daylight to these areas comes from the three rings of port-hole windows, giving the Tower its distinctive look from the outside.

Observation Level

Each of the Motor Rooms at the top of the Tower – at levels 119 and 113, have been fitted with large windows.

Additionally similar windows have been included at level 103 served by both the Engineers' Lift and the High Speed Lift. This level had been designed as an observation or Viewing Deck for Visitors (segregated from the hazards of Lift Machinery and other moving parts).

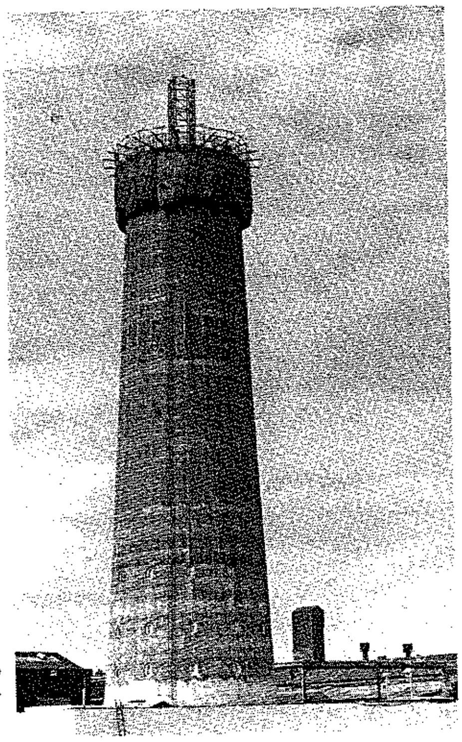
CONSTRUCTION

The Tower rises 127.25 m (418 ft) from ground level. Saint Paul's Cathedral is 365 ft., Salisbury Cathedral spire (the highest in Britain) is 404 ft. and the British Telecom Tower in London 680 ft.

The tower shape is of a tapering nature for three quarters of its height. Its diameter at its base is 14.6 m tapering to 8.5 m at the top.

Due to the local soil characteristics, conventional piling was not used, and instead the tower 'floats' on a raft 24 m diameter and 3 m thick. The construction of this raft was an important stage of the overall building plan, since the temperature gradient had to be controlled during setting to prevent cracking. The base was cast in separate 0.5 m and 2.5 m pours totalling some 2450 tonnes of concrete. The concrete was premixed, delivered by lorries and laid in about six hours.

The tapering outside is in effect a windshield and was formed by a conical slip-form rig of some 24 yokes rising on 24 hydraulic jacks, each of 4 ton capacity, pulling on 34 mm diameter threaded jacking bars cast into the walls as the slide progressed. This continuous slip-form technique meant that the tower form literally grew, to the amazement of local inhabitants, over a four week period. The maximum rate of growth was just under 300 mm per hour, that is to say 7.2 m in 24 hours.



Tower at 49 metres, 9th August 1980.

The internal lift shafts were not so easily constructed due to the number of lift shaft openings and the complication of intermediate floor slabs, and so jump-form shuttering techniques were used. All three shafts were shuttered and concreted at the same time achieving a 2.4 m lift every two days.

In all the structure above ground weighs 4000 tonnes, and whilst the specification called for

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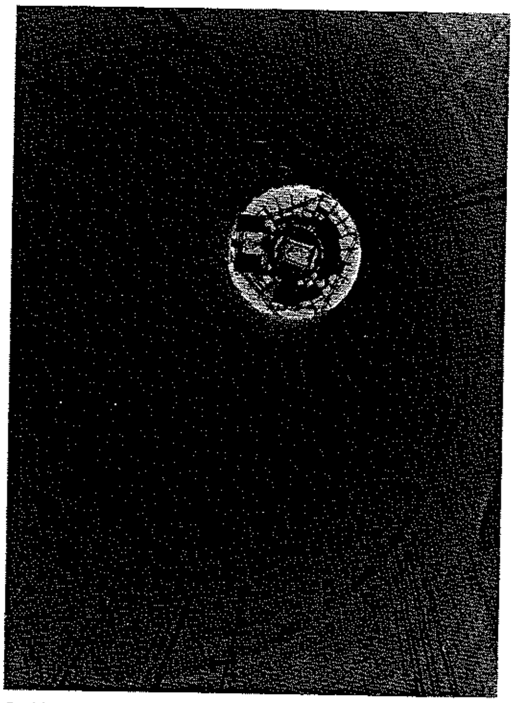
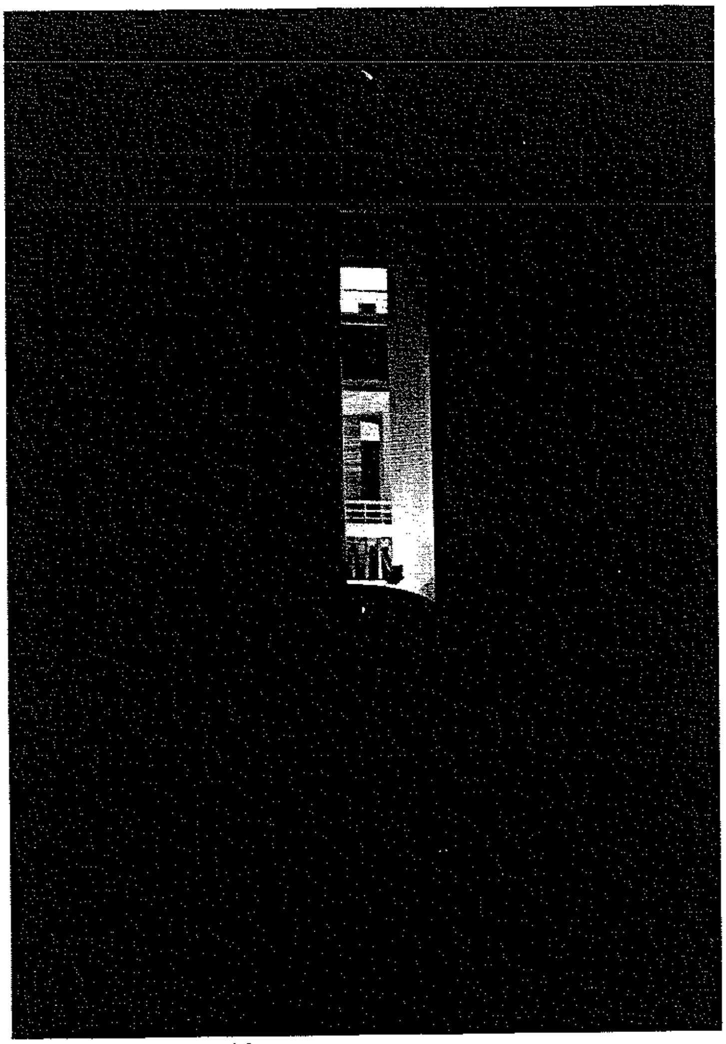
a plumbing tolerance of a maximum of 15 mm over a 30 m section, the actual deviation was 10 mm.

The design of the top section is of significance. In order that the tower was reasonably stable in high winds, some method of damping was necessary. In many tall structures (e.g. the British Telecom Tower) this is achieved by placing a large heavy 'pod' on the top. This was not required by the Express Lift Company and, therefore, an alternative method was devised whereby, in effect, at the top the windshield is removed to reveal the lift shafts, thus reducing the suction force on the leeward side by virtue of the through-holes and irregular shape breaking up the vortex effect.



Inside the tower during construction of outer shell.

Architects:	Stimpson and Walton, Northampton
Consulting Engineers:	Michael Barclay Partnership, London
Quantity Surveyors:	Ernest Howard and Son, Northampton
Builders:	Tileman and Company, London



Top of the Test Tower at night.

By Appointment
to Her Majesty The Queen
Manufacturers and Suppliers
of Passenger Lifts

The Express Lift Company Ltd.
Abbey Works, Weedon Road
Northampton

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Produced by Matthew Fraser Ltd., Northampton