

## **Terry Wilson on the British Gas HQ Design Group**

### **My Background**

1944 -At 16 years of age I had achieved reasonable exam results at school but - fed up with the grammar school environment -I did not want to move on to the 6<sup>th</sup> form. The war was still going on and Dad was abroad in the RAF. Mum says "you are a natural engineer you need a degree" and persuaded Essex Education to finance an out of county course at Regent Street Polytechnic leading to London University civil engineering degree course. Graduating in 1948 the powers that be decided that, rather than conscript me to the forces, I should take a job of "national importance" so I started as a site engineer building roads and sewers on Harold Hill housing estate in Romford.

Seeking a broad experience base for my career I changed jobs every couple of years to consulting engineers, chemical engineers, car manufacturer and then in the Iranian oil fields. Returning to England I settled for 10 years in the head office of Peter Lind & Company, civil engineering contractors with a strong interest in design and construct contracts. My work included design of a wide variety of permanent and temporary works but my specialities were jetties and holes in the ground (e.g. temporary works for the Post Office (now BT) Tower foundation). The jetties included the LNG jetty at Canvey and the oil jetty at Teesport (now refurbished and operating as Teesside GasPort Marine Jetty). I studied direct in-ground storage of LNG as a possible area of work for our company. Little did I know that years later I would be involved in dealing with the effects of the growing ice wall and eventual filling up of the in-ground storage at Canvey. My opportunities for advancement at Peter Lind were limited, I needed to change my job. I joined a petro chemical design company in charge of their civil engineering section but I was unsettled when I was sent to manage a small office on site at Fawley Refinery.

### **I Join the Gas Council**

1969 -I responded to an advertisement by the Gas Council seeking project engineers. My interview with Director of Engineering (Geoff Roberts) and Construction Engineer (Les Thompson) went well; their strategy was to appoint engineers from different disciplines, I was their choice of civil engineer. Working from the Bryanston Street office construction department was managing several projects. I worked on the compressor station at Alrewas and on pipelines and grid control centre and accommodation for plant engineering on the site of the old Hinckley gasworks. Later I worked on adapting for plant engineering the redundant electricity board offices in Hinckley, and adding a compressor at Ambergate.

Conversion was in full swing, North Sea gas production was increasing, a National Transmission System (NTS) was to be built with reception installations on the coast, hundreds of miles of pipelines with compressor stations at around 40 mile intervals plus strategic LNG and compressed gas storage. A new Gas Act unifying the industry was planned, the Gas Council would be wound up to emerge as British Gas Corporation Headquarters.

### **Design Group is formed**

1972 - Construction Department faced a heavy work load to build the NTS. Redundant North Thames offices at Paddington were taken over and the four separate design sections, engineering drawing office, civil, electrical and mechanical engineers were moved there. I was invited to head the civil engineers but argued for a more integrated approach so Design Group was set up embracing the engineering drawing office, mechanical engineers and civil engineers. Head of Design (Ron Attfield) led the mechanical engineers while I as Deputy Head of Design led the civil engineers. Chief Draughtsman (John Hollis) was already well established. Initially the work of the Design Group was mainly the preparation of drawings and specifications for tender enquiry and the vetting of contractor designs. As the distribution system grew there was a demand for a more standardized approach to design so more projects were fully designed "in house". This policy ensured that we had a strong engineering base to control contractor designs.

## **The Architects**

The NTS needed sites all over the country, Engineering Planning Department, working closely with a private architectural practice (Architects Design Group), had an excellent record for locating suitable sites and securing planning permission. However there was growing unease that plant layout and building details were being compromised through insufficient consultation with the engineers before seeking planning consent. A staff architect (David Hollis) was taken on to join the civil engineers and Design Group increased their efforts to influence the work of Architects Design Group before planning consent was sought.

As the I.R.A. was becoming more active there was concern that our installations were vulnerable to bomb attack. Design Group took over detailed design of control buildings, our architect worked with the civil engineers to design more robust buildings in concrete and brick. With an additional architect and technicians the architects became well established and were responsible for much of the building design thereafter, including the buildings for St. Fergus terminal, Hornsea salt cavity storage and the Morecambe Bay gas field base at Heysham.

## **Drawing Office**

At Marble Arch John Hollis had built up the drawing office for the Gas Council, initially to provide photographic and graphic design support but with engineering draughtsmen being added as demand grew. When Design Group was formed the engineering draughtsmen moved to Paddington, however as we moved to full design "in house" many more drawings were needed and a contract drawing office was planned. Shortly after moving to Paddington John Hollis retired and Wally Hart was appointed Chief Draughtsman.

A specification was drawn up covering draughtsman numbers, grades, selection process, premises & etc. We guaranteed employment of 40 but included flexibility under reasonable notice to vary numbers up to 60. The contractor would also provide clerks, materials and drawing printing facilities. Our Chief Draughtsman would work with the contractor's manager on staff selection, discipline, job allocation etc. Technical direction would be by Design Group engineers. The contract drawing office was set up in Holborn. The initial contract was for 2 years, it worked well, and a 2 year extension was negotiated. Our workload was still expanding and a new drawing office contract was let, the new premises were at Highbury and draughtsman numbers were to be 80 to 100, this contract was subsequently renegotiated and extended several times with draughtsman numbers peaking at about 110. Running this important contract took up most of Wally Hart's time.

When Construction Department moved to spacious accommodation in Bishop's House Holborn a Drawing Office Manager (Tony Nixon) was appointed to bring cohesion to the several drawing office activities and to manage the introduction of Computer Aided Design (CAD).

## **Computers in Design**

When I started as an engineer calculations were by slide rule or, if greater accuracy was required, 7 figure logarithms. I became interested in computer developments and in 1962 I learned Autocode which was the language used to program the Ferranti Pegasus computer. To use this machine I would write my program code and make up data forms for completion by myself or others. This would be posted to Ferranti who would transfer the information to punched paper tape, run the machine overnight and return results by post next day. My first task for Pegasus was to help site engineers who were spending hours calculating vertical and horizontal angles from setting out points ashore, for each pile on Canvey jetty. My last task for Pegasus was a series of calculations to determine the behaviour of 600 ton concrete base sections of caissons for the Teesport jetty launched down a 10% gradient slipway into the Tees.

When Design Group was formed slide rules and seven figure logs were still the norm but changes were afoot. We had a problem designing the feed pipe support system for the LNG tank at Glenmavis. With the aid of my new electronic calculator I calculated the stresses arising in tank and pipework as the tank wall distortion under liquid pressure was restrained by the tank base and pipe supports.

Electronic calculators were immediately adopted as our main means of calculation. Engineering Research Station were using main frame computers for pipe stressing work. A teletype terminal and modem was installed in our Paddington office so that our mechanical engineers could use the system. The civil engineers saw that programs were available for earthworks, drainage and structural design and started to use these for out of the ordinary calculations. Soon after our move to Bishops House early microcomputers started to become available. We had a couple of Superbrains which were well used, there was also a Commodore Pet in the office.

A purpose designed main frame system was introduced as the main project management tool for Construction. On the whole this helped Design Group but the amount of paper form filling it involved caused some resentment.

Personal computers started to be brought into Design Group in the early 1980s, by 1983 the engineers and architects had set up their own network so that files could be exchanged and the A3 printer could be shared. When necessary our acoustic couplers were used to access external computers. The architects, in addition to directing the drawing office draughtsmen, were producing their own drawings and sketches with Autocad. Several years passed before this system was superseded by the company wide network.

### **Sidelines**

Apart from our mainstream production work we would from time to time be approached for advice and assistance on several fronts. Providing support for working parties on codes of practice in preparation by IGE and IHVE come to mind, also sorting out problems on sites such as damp buildings or leaking fire water ponds. We even had a local authority ask for advice on painting seaside railings. Near the end of my career I had a call for help from SEGAs which had decommissioned Greenwich works, and let part of the site to a scrap metal dealer. Unfortunately the dealer had overloaded the quayside and damaged the sheet pile wall on the Thames bank. His insurer had engaged a consulting engineer to produce a proposal for remedial works, the SEGAs manager had engaged another consulting engineer to vet the scheme. When the two engineers could not agree on a satisfactory scheme SEGAs turned to us for assistance. I worked with one of my engineers (Ken Davey) to analyse the situation and persuade all concerned to accept our modified scheme. We knew it was an important site -I am reminded of that whenever an event from the O2 Arena is televised.

### **Musings on St Fergus**

Sean Coogan was our civil engineer leading the design of St Fergus terminal. He will tell the main story but it was a project in which I had a close personal interest and I was involved in all key decisions on the civil side. There was considerable pressure to fast track this project and I drew on personal experience to put forward ways to achieve this.

Early in my career I had worked as an agency draughtsman at Ford Motor Company in Dagenham, They had a senior civil engineer, a mechanical engineer and a few general purpose draughtsmen for minor works around the factory. An urgent need arose to build a new foundry: a consultant for the civil and building works had been appointed but progress was slow. They faced the recurrent problem of the civil engineer on industrial projects— design cannot proceed without detailed information from the equipment suppliers. The senior civil engineer suggested that I might be able to get hold of sufficient information to determine a piling layout and get a piling contract under way.

We had a block layout showing column centres and approximate positions of all plant items. I trawled around the factory quizzing all the different disciplines for typical dimensions and loads for the plant and a mixture of drawings of existing plant and drawings of typical plant to be supplied was unearthed. I roughed out designs for the steel structure and produced preliminary designs for bases and plant foundations and then produced the piling layout. Some 600 piles were driven to my layout saving 3 months on the project. Only half a dozen extra piles were needed to complete the job when final details became available.

For St Fergus I proposed a similar approach and most of the piles were driven on preliminary information. In order to advance work on the compressor houses and control rooms we needed to install drainage at an early stage. Between the compressors and our outfall a large area was set aside for pipework for which we had no firm information. To overcome this we lowered drain levels sufficiently to allow for 2 layers of buried 36" pipe to pass over without interference.

Early in the contract there was a spell of wet weather and progress with earth work was well behind schedule. The project management and main contractor (Lilley) wished to push ahead but the earthwork subcontractor (Scottish Land) resisted, promising to bring extra plant to the site once the weather improved. Having myself worked on site up to my knees in mud and as a contractor forced by contract terms to press on with excavation for a reservoir in wet conditions I supported the earth mover. The weather duly improved, extra plant was brought to site and within 3 weeks the contract was back on schedule.

### **I Retire**

1988- I retired in January but continued working on a temporary basis for a few months until succession arrangements were finalised.

26 years later I hold fond memories and respect for the many colleagues I worked with.

Terry Wilson  
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