Hugh Porter
Civil Engineering 1988 – 2001
2000 word experience report

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### Outline record of academic and professional career

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<tr>
<th>Dates chronologically</th>
<th>Academic Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>9 GCE ‘0’Levels</td>
</tr>
<tr>
<td>1985</td>
<td>3 GCE ‘A’ Levels (B Mathematics, C Physics, C Technology)</td>
</tr>
<tr>
<td>1998</td>
<td>Civil Engineering, Imperial College BEng (Hons) ACGI</td>
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<table>
<thead>
<tr>
<th>Dates chronologically from to</th>
<th>Professional Career – circa Value (£ millions) – Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>09.1988 – present</strong></td>
<td>Carillion Construction Limited (formerly known as Tarmac Construction Limited)</td>
</tr>
<tr>
<td>09.1988 - 06.1989</td>
<td>M40 Banbury Bypass Contract 3 – £50m – Structures Site Engineer</td>
</tr>
<tr>
<td>12.1992 - 10.1993</td>
<td>Sulzer Escher Wyss, Zurich(CH) and Ravensburg(D) – £n/a – Foreign Trainee</td>
</tr>
<tr>
<td>04.1996 - 09.1996</td>
<td>Team 2000 – £n/a – Full time Facilitator in Self Managed Team working across Carillion companies</td>
</tr>
<tr>
<td>10.1996 - 12.1996</td>
<td>Balsall Heath Forum – £n/a – Project Manager within Community seconded through Business in the Community Carillion Awarded Lord Mayor of London Dragon Award for work in Balsall Heath - 01/97</td>
</tr>
<tr>
<td>11.1997 - 03.1998</td>
<td>Head Office Work Winning - £20m to £100m – Manager Input into Channel Tunnel Rail Link tenders 430 and 320 and successful London Underground Limited's Corporate Track Alliance Programme tender Project Manager for Carillion Engineering and Construction’s “Y2k” programme</td>
</tr>
<tr>
<td>04.1998 - 06.2000</td>
<td>Corporate Track Alliance Programme – £18m – Cost &amp; Value Manager Responsible for commercial department under modified NEC Engineering &amp; Construction Contract option C, Contract required onsite estimating in ‘term’ contract generating value and cost control. Alliance required new approach from company and people</td>
</tr>
<tr>
<td>06.2000 - present</td>
<td>JNP Track Works – £30m – Contractors’ Alliance Cost &amp; Value Manager As above but commercial manager for three companies in alliance. The design build contract involves discrete major track renewal works across the Jubilee, Northern and Piccadilly lines of London’s underground. Works are carried out at night over several weeks, in a whole weekend (52-72 hours) or in extended line section closures of several weeks.</td>
</tr>
</tbody>
</table>
1 Introduction

I have gained

- a breadth of experience throughout project lifecycles and across the industry,
- increasing responsibility and have undertaken roles in research, on site, in quality assurance, training, business development and now in commercial and strategy development,
- knowledge and insight into our local communities and how we can support each other
- a passion to help and inspire other people to enjoy their work as much as I do.

Figure 1  Career – 1998 – 2001 by functional role
2 Green fields

I joined Carillion’s M40 Contract 3 in September 1998. The ICE 4th Conditions of Contract provided 12km of dual three lane motorway for the Department of Transport; tender value was circa £60m.

Structures were designed to minimise and allow for settlement from any future coal mining. The main structures had reinforced box section abutments to spread the load and jacking beams under the bearings.

There were 22 main Structures, 14 under bridges and 8 over bridges, and a further 13 culverts. The road materials consisted of

- 22,000 t sub-base
- 60,000 t CBM3 (Cement Bound Material)
- 360,000 m$^3$ CRCR (Continuously Reinforced Concrete Roadbase)
- 40,000 m$^3$ bituminous flexible surfacing

![Key Statistics of M40 Contract 3, Banbury Bypass](image)

**Figure 2** Key Statistics of M40 Contract 3, Banbury Bypass
In my first 3 months I worked for the Roads Section Engineer, working with a chain person and another graduate engineer.

- I maintained line and level control for trials of the concrete train. I increased productivity by reorganising the setting out process to avoid disrupting concrete wagon access.
- I installed mainline earthworks control and learnt the importance of careful planning and checking.

In January I became responsible for daily operations and material takeoffs for the contract's northern bridges reporting to the Structures' Section Engineer.

- In my diary I noted progress and resources used on site and any delays (e.g. weather or unplanned works).
- I monitored the weekly programme, which I took over responsibility for producing after 2 months.
- I checked dimensions and details on the design drawings were consistent raising written Technical Queries, with the Resident Engineer (RE) on anomalies or omissions.
- I involved the trade gangers and subcontractors in planning work. I issued from duplicate books clear instructions and sketches for use on site.
- I ensured that the RE's staff checked and witnessed works at the correct times.

Experience taught me that grass grows quickly over poorly planned material lay down areas, shuttering and objects to be cast in concrete must be adequately checked before and after pouring and that extremes of weather need to be considered well in advance.

I began to look beyond just the mechanics of accuracy, control and basic planning that I started out with to consider risk assessment and contingency planning.

![Figure 3](image)

Figure 3  Northern Bridges and Haul Road on Banbury Bypass Contract 3
Figure 4  (top) Isometric sketch used on site, (bottom) plan used in technical query
3 Feasibility

I was keen to develop a breadth of skills outside a traditional contracting route. I moved to Liverpool in July 1989 seconded to Mersey Barrage Company (MBC) which was starting Stage II studies at a cost of £2m. MBC was set-up to examine the impact of a tidal barrage and optimise a preferred scheme for further development. Funded equally by the public and private sectors costs were recovered on a reimbursable basis; after 12 months the funding increased to £10m and full-time staff exceeded 50.

I reported to Project Manager Adam Wilson, a chartered civil engineer. I had responsibility for development and application of 2-dimensional (2-D) hydrodynamic, energy and financial numerical models. I had to comment on the accuracy and limitations of the model data that were used in studies into accommodation works, construction, shipping and environmental aspects of a power station.

The base hydrodynamic model was developed by Professor Falconer, whose published papers demonstrated its capability. I studied his papers and set out to ensure that the model was understood and used correctly.

To do this I:

1. determined confidence levels and variability of input data in time and space,
2. developed a modular structure for options; varying the number, position, type and operating characteristics and regime of the turbines and sluices across a full range of tides was then possible,
3. developed analytical tools to interrogate and present model output for validation and use by others.

I created a Quality Assurance control system for both model development and option simulations. New data from site investigations and basic research were procured as a result of recommendations I made as to existing data’s suitability.

I budgeted, programmed, sourced and procured resources I required, managing a team of three graduates and three external consultants.

I successfully developed an option to simulate energy yield and hydrodynamics of the existing tidal power station in Brittany. Validated data were purchased by the French consultant SOGREAH for improving access to St Malo for larger ferries.

A paper written by Porter and Wilson was presented to a Conference in 1992.

![Aerial View of the Rance Tidal Power Station in Brittany](image)

**Figure 5** Aerial View of the Rance Tidal Power Station in Brittany

![Area of near barrage model for Rance estuary showing depth contours](image)

**Figure 6** Area of near barrage model for Rance estuary showing depth contours
4 Abroad

At MBC I had worked with Sulzer Escher Wyss (Sulzer), a Swiss manufacturer of water turbines. I put together a proposal to have a year’s training and experience in their offices. MBC, Sulzer and Carillion jointly agreed to fund this starting in December 1992. I reported to local line managers and was given mentors to guide and review my progress.

I devised a computer batch process for financial appraisal of turbine runner model’s performance across the client’s operational range that could run unattended overnight. Replacing a paper system this cut runner development time by 75% and by discounting flawed options enabled high potential models to be physically tested earlier.

I developed a spreadsheet that gave indicative loading on foundations at various stages of construction for small turbines. The dimension and weight of key components were specified allowing for a quick comparison of potential projects against existing plant.

I learnt about forms of contract based on plant performance and about working for a purchaser of civil engineering services.

![Figure 7: Extracts from bulb turbine foundation loading spreadsheet](image)

**Figure 7**

Excerpts from bulb turbine foundation loading spreadsheet.
5 Live motorway

MBC was mothballed in early 1993. I returned to site in November with the aim of gaining core site engineering skill and experience.

I joined the £100m ICE 5th contract with the Highways Agency to both widen and reconstruct 12km of the M6, between Junctions 20(J20) and 21a in Cheshire. The contract included constructing the new Thelwall viaduct.

Widening

After 2 months spent familiarising myself with a site again, I managed site engineering operations for 5km of phased widening, including the M56 and J20 on slip roads, as an Engineer reporting to the Roads Section Engineer.

Inspired by a Tom Peter’s ‘In search of Excellence’ seminar, I organised the 6 site engineers, 2 trainee technicians and 3 chainmen I was responsible for in a supportive team structure. Key areas of responsibility for engineers’ groups were:

- main works bulk earthworks - line and level, productivity and operations planning
- detailed operations – communications, kerb drainage, phased carriageway crossings
- site clearance, fences, underground services and diversions and new drainage runs.

I setup an operational base at J20 with wall mounted, overall and detailed programmes including target and actual productivities. Each group needed to know what the others were doing. A laminated plan of the site works logged activity permits and expiry dates, Technical Query details and major equipment locations and their next planned movements.

I started at this stage to write letters to the RE and receive instructions on site. I was responsible for checking and signing off detailed Operation Plans, Method Statements and Safety Risk Assessments for all the works being undertaken.

Figure 8 M6 - Sketches from Operations Plans and Permit to Dig
I created check sheets for each major element of work which were signed by the RE’s staff; for catchpits these had setting out information, iron work and specification requirements. These avoided duplication of effort; the same sheet could be used for the operation plan and allowed engineers time to be more efficiently spent doing productive work. Unfinished works and abortive works were negligible. This compared well to a previous phase of works.

Interchange
I was promoted to Section Engineer in January 1995 working for the Roads Agent and took responsibility for managing the phased interchange works at J21a, installation of oil interceptors and remaining side road diversions. I maintained the team ethic I had started with my new team of 2 Engineers and 5 site engineers.

Planning
I found our tender estimators’ programme for the interchange was unbuildable. He had overlooked design level changes from adjacent old and new carriageway in excess of 750mm.

I optimised traffic phases considering grade changes, construction widths and temporary works required, including signs, lighting, drainage and pedestrian diversions. The interchange works were completed and accepted ahead of the original programme with few remedial works; one phase cut 3 weeks off the 20 week programme as it allowed us to work more productively and safely. It increased the diversion distance but eliminated two changes traffic management and thereby reduce potential risks to all parties.

Services
There was limited knowledge of the many existing services. I appointed a Services Co-ordinator who organised trial holes and then maintained a live coloured plan with co-ordinated details. We had no incidents of cable strikes after his appointment.

I managed to avoid previous problems with damaged lighting cables at duct crossings by ensuring early programme liaison between civil and electrical contractors, early mandrel testing of ducts, wise temporary lighting feeds and enhanced protection at vulnerable areas and times.
Safety
Throughout 1994 I organised 25 weekly Positive Safety Behaviour Audits with a colleague as part of a Health and Safety Executive study. I gave monthly feedback tool box talks which were also used to agree and assess targets. Targets were displayed with actual performance at the time clocks. We addressed a decrease in positive behaviour as a Sectional Completion approached. I now promote positive measures as I have seen how effective they are.

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birchwood Bridgeworks</td>
<td>Overall tidy. Electrical cable being laid out from generator under east abutment to service deck. Operation obstructing scaffold walkways in two places particularly on ladder.</td>
<td>J B</td>
</tr>
<tr>
<td>14:15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to West Pier (south end), base plates at risk of being undercut by erosion</td>
<td>Access to West Pier (south end), base plates at risk of being undercut by erosion</td>
<td>J B</td>
</tr>
<tr>
<td>14:50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel fixer claimed not to have been issued ear defenders in safety bag was not wearing ear defenders with circular saw</td>
<td>Steel fixer claimed not to have been issued ear defenders in safety bag was not wearing ear defenders with circular saw</td>
<td>J B</td>
</tr>
<tr>
<td>15:10</td>
<td>Sorted</td>
<td>M O'B</td>
</tr>
<tr>
<td>Lifebelt to SE of bridge has no rope attached. There are 2 no lifebelts at SW bank and none visible on the North bank.</td>
<td>Lifebelt to SE of bridge has no rope attached. There are 2 no lifebelts at SW bank and none visible on the North bank.</td>
<td>J B</td>
</tr>
<tr>
<td>16:00</td>
<td>M O'B</td>
<td></td>
</tr>
<tr>
<td>Lifebelt at SE of bridge has no rope attached. There are 2 no lifebelts at SW bank and none visible on the North bank.</td>
<td>Lifebelt at SE of bridge has no rope attached. There are 2 no lifebelts at SW bank and none visible on the North bank.</td>
<td>J B</td>
</tr>
<tr>
<td>16:10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifebelt claimed not to have been issued ear defenders in safety bag was not wearing ear defenders</td>
<td>Lifebelt claimed not to have been issued ear defenders in safety bag was not wearing ear defenders</td>
<td>J B</td>
</tr>
<tr>
<td>16:20</td>
<td>Sorted</td>
<td>M O'B</td>
</tr>
<tr>
<td>15:10</td>
<td>Sorted</td>
<td>M O'B</td>
</tr>
<tr>
<td>In area south of Padgate Brook adjacent to gantry goalposts are absent from access point crossing under lines</td>
<td>In area south of Padgate Brook adjacent to gantry goalposts are absent from access point crossing under lines</td>
<td>J B</td>
</tr>
<tr>
<td>Access routes clear and cranes working with attentive banksmen.</td>
<td>Access routes clear and cranes working with attentive banksmen.</td>
<td>J B</td>
</tr>
<tr>
<td>16:40</td>
<td>Sorted</td>
<td>M O'B</td>
</tr>
<tr>
<td>No comments</td>
<td>No comments</td>
<td>J B</td>
</tr>
<tr>
<td>16:30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deck is poor due to stored material.</td>
<td>Deck is poor due to stored material.</td>
<td>J B</td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No first aid kit or radio for persons working in area.</td>
<td>No first aid kit or radio for persons working in area.</td>
<td>J B</td>
</tr>
<tr>
<td>17:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation tag signed off on 10/8/94 (date of audit)</td>
<td>Excavation tag signed off on 10/8/94 (date of audit)</td>
<td>J B</td>
</tr>
<tr>
<td>16:30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifebelt claimed not to have been issued ear defenders in safety bag was not wearing ear defenders with circular saw</td>
<td>Lifebelt claimed not to have been issued ear defenders in safety bag was not wearing ear defenders with circular saw</td>
<td>J B</td>
</tr>
<tr>
<td>16:50</td>
<td>Sorted</td>
<td>M O'B</td>
</tr>
<tr>
<td>Deep drain adjacent to Massey Brook Lane safe and with current Excavation tag signed off on 10/8/94 (date of audit)</td>
<td>Deep drain adjacent to Massey Brook Lane safe and with current Excavation tag signed off on 10/8/94 (date of audit)</td>
<td>J B</td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation tag signed off on 10/8/94 (date of audit)</td>
<td>Excavation tag signed off on 10/8/94 (date of audit)</td>
<td>J B</td>
</tr>
<tr>
<td>17:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benches attentive and vehicles all with reversing klaxons</td>
<td>Benches attentive and vehicles all with reversing klaxons</td>
<td>M O'B</td>
</tr>
<tr>
<td>16:20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional pedestrian access or radio required in case of emergency</td>
<td>Additional pedestrian access or radio required in case of emergency</td>
<td>M O'B</td>
</tr>
<tr>
<td>16:30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 9
a) Front summary sheet used for briefing site personnel  
  b) Detailed commentary

Management and other roles
I now became involved in setting up orders for materials and suppliers and liaising with the Roads Works Manager on issues across the whole project.

During this period I was site liaison engineer for the lighting subcontractor and became Crane Co-ordinator and Temporary Works Co-ordinator for the Roads Section.
6 Facilitation

6.1 Corporate

In April 1996 I became one of twelve individuals, Team 2000, chosen from 15,000 Carillion Construction employees, to become full-time facilitators. We formed a self-managed team to facilitate change responsible through a mentor to the main Board of Directors. We generally worked in pairs and I undertook 14 assignments – two examples follow.

Crown House Engineering – North East

I interviewed 100 electricians and fitters on a one-to-one basis about what they thought about their business.

### Figure 10

*Crown House interviews summary of responses to questions 3 -10*

I collated and interpreted the information into a report that was actioned by local management. I learnt 101 great things about simple but effective systems for loss and cost control but also about the wealth of talent, respect and knowledge that resides in our workforce.
Building - Estimating Process
I interviewed estimators, throughout the Building and Contract Housing businesses, on the systems and processes they used. I produce a report for the Commercial Director recommending actions he should consider based upon criteria in the agreed brief.

Figure 11
Building estimating process analysis; 12 business unit across, work breakdown structure down page (page 3 of 3).

I learnt about the tendering process as I set the systems used against a work breakdown structure. I also learnt some of the best ideas that Wimpey and Carillion had developed individually around the country.

6.2 Community
In October 1996, I was seconded to work as a Project Manager in Balsall Heath. This was part of Carillion’s and Sir Neville Simms commitment to Business in the Community.

I learnt how careful listening and a small amount of well-targeted effort can help people immeasurably.

Figure 12
BitC - a) Case Study output  
b) Secondment objectives
6.3 Project

In January 1997 I returned to Carillion Civil Engineering and became Business Systems Manager for London and a trained Quality Auditor. I reported to the Head of Business Systems.

I pioneered the implementation of Integrated Management Systems in Carillion. My strategy had been helped by my involvement with the Midlands Construction Forum.

I raised awareness of good practice across the company through national forums and went to cross industry working parties.

**Figure 13**

Audit results presented to National Forum showing relative site performance across sheet and strong/weak areas of company performance down the sheet

I presented a lecture at the ALGS residential course of Health and Safety in June on my work on Integrated Systems.

6.4 Work Winning

Between December 1997 and March 1998 I was involved in three teams putting together the tender documents and presentations. All three tenders were for Option C Engineering and Construction Contracts.

We were successful with London Underground Limited and were awarded a contract under the Corporate Track Alliance Programme for three years in September 1998.

My current role and experience is recorded in the 4000 word report.