

A PROVEN TRACK RECORD

DAVID WABOSO FREng

For David Waboso FREng, engineering was a natural career choice, via a brief foray into teaching at an inner city comprehensive. Having spent his early engineering career in roads and water supply, he is now a key part of the leadership team responsible for the railway journeys of up to four million daily travellers, and for an investment programme of billions of pounds over the next five years. Michael Kenward OBE spoke to London Underground's Director of Engineering.

Unlike most youngsters, David Waboso was lucky enough to encounter a careers master who actually knew about engineering. Waboso's progression into a career that would eventually land him one of the highest profile engineering jobs in the country began when he turned up for that fateful meeting. At the time at school in Gloucester, Waboso had no real idea of what he wanted to do, beyond wanting to avoid medicine – surrounded as he was at home with a father and two brothers and a sister in the medical profession.

A keen sportsman, "I used to be a mad keen rugby player," Waboso liked being outdoors and wanted to carry on with that. But apart from being practical, "good at maths, physics and stuff," what should he do for a living? "Do you like travelling?" asked the careers master. "Certainly," was Waboso's response. Then the master asked how he felt about dams, rivers and railways. "I thought that sounds interesting," says Waboso. You want to be an engineer, was the advice. "It was as simple as that."

STUDYING AND TEACHING

Waboso looked into the possibilities and went off to study at Coventry and then at Imperial College. There he studied water engineering as a special project, something that came in useful when his career finally started to take off and he went to work in Africa.

Waboso's first job in civil engineering (today he is a Chartered Engineer, a Fellow of the Institution of Railway Signal Engineers as well as a Fellow of the Institution of Civil Engineers and the Association for Project Management), working in Chester on road projects did not seal the deal for engineering. His first inclination was to teach. "I saw an advert by the Inner London Education Authority (ILEA) for maths teachers. I went along to County Hall and literally within a couple of weeks I was in a classroom teaching maths." This was back in 1980.

ILEA ran some of the capital's more 'difficult' schools. Waboso found himself teaching in Stoke Newington. It was, he admits, a tough school. Then again, he



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says that it was also "a demanding and really rewarding experience".

That short time in the classroom taught the teacher some important lessons. Teaching is all about how to communicate complex principles, clearly and simply, and how to grab people's attention, says Waboso, skills that also come in useful as an engineer. Another lesson from those days in the classroom might seem less obvious. "One thing I learned from teaching was never to ask a rhetorical question." The obvious trap for new teachers is "what do you think I am doing here?" – your pupils will robustly and quickly offer you their views. "Never ask a question unless you are sure that it is taking you somewhere", Waboso advises.

THE CONCRETE TRAIN

After deciding that he did not want to be a teacher for life, Waboso went to work for Ove Arup. One of his first jobs was working on the Chequers Road bridge, on the M25. Waboso says that the real lesson that he took home from his days on the motorway

was that, "when you start building something you start spending a lot of money very quickly. And it is just as well to get everything right." Here he is talking about 'the concrete train'. Nothing to do with the railways that would later capture Waboso's professional attention, "this 'production engine' churns out concrete road surfaces by the mile. We had to make sure all the materials and alignments were sorted out, make sure it was right."

"It taught me a lot about production processes in engineering," says Waboso. The 'train' was an expensive bit of kit. Get it wrong and hundreds of people end up standing around doing nothing. "I learned very early on about the concept of 'the standing army' in engineering. People ask why engineering costs so much? It costs so much because it is labour-intensive. You have got to try to get things right first time."

OUT TO AFRICA

For Waboso, engineering is an opportunity to do good things for people and sorting out problems. "In my career I have always tried to do things that help and are of value to a lot of people." This desire to do something useful came into its own when Waboso spent some time in West Africa. Waboso's father was one of Nigeria's leading gynaecologists so the opportunity to work there with civil engineering consultants Pell Frischmann, then Parkman, was not to be missed. Among other projects, he worked on the Kaduna water supply scheme in northern Nigeria, a major undertaking supported by the World Bank.

It was while he was in Africa, when he was investigating options about moving oil products around Nigeria, that Waboso first came across railway engineering. Africa also gave Waboso his first experience of running the show. "When the general manager left the office, I was in charge." That meant dealing with a big team of people, working out their travel arrangements, dealing with clients, invoicing suppliers and the like.

His time in Africa also gave Waboso the opportunity to tick off two of the boxes needed to round out a high-flying engineer's career: he gained management experience and he had worked abroad. "In an engineer's life it was considered that you had to go and get two or three years' overseas experience. That was how you got your seniority." The fact that there were few engineering jobs in the UK at that time meant that many young engineers had to work worldwide. "You went wherever the investment was."

CHANGING TRACK

David Waboso really began to focus on railways in the early 1990s working with the Nichols Group on some of the upgrades needed for London's newly completed Dockland Light Railway (DLR). Waboso's first big railway project in charge was the DLR's Delta Junction, a major intersection in the middle of the network. As resident engineer he had to move tracks and signalling, and rebuild a station over West India Quay, thus started an involvement with signalling that has run through his career. He was subsequently asked to become DLR's Project Manager for the new Moving Block Signalling System. Out went the old system and in came a system where trains work out where they are relative to each other rather than relative to the fitted infrastructure.

Working on the DLR brought home to Waboso one of the facts of life of working on railways, dealing with a major shutdown. "I remember being very very stressed about shutting the railway for four days. Will we ever reopen it?" It did not help that an earlier 'possession' – the industry's label for kicking everyone off the system and flooding it with teams of engineers and workers – had gone badly on the DLR, reopening three days late. "We did get it open, which was perceived as a triumph."



David Waboso giving the Hinton Lecture on Building a World Class Tube for a World Class City in October 2007

It wasn't just the travelling public that noticed the smooth return to service, Waboso's work on the DLR's resignalling won him first prize as UK Project Manager of the Year from the Association for Project Management in 1995. His success on the DLR also resulted in an invitation to work on London Underground's Jubilee Line, which was then struggling to complete a new extension in time for the 2000 Millennium celebrations in London's Docklands.

RIGHT SIGNALS

Waboso joined the Jubilee Line in 1995 and was a part of the team that managed the mad dash to get the line open. To achieve this they had to "tone down" the project's

ambitions. Waboso had to advise them to abandon the moving block approach to signalling that he had implemented on the DLR. This involved convincing a lot of stakeholders to change direction – back to communications – a key skill for engineers. There just wasn't time for sophisticated new technology. "It was a great achievement to deliver a working train control system by December 1999."

As if he had not had enough troubleshooting, the Strategic Rail Authority and the Railways Safety Standards Body then asked Waboso to lead an industry-wide group working on the implementation of an improved automated train protection (ATP) system on the UK's railways. In the

wake of serious mainline rail crashes at Ladbroke Grove and Southall, the Uff/Cullen Inquiry called for the implementation of an improved version of ATP, the European Rail Traffic Management System.

Demanding such a system is one thing, implementing it requires some serious engineering. The exercise came down to balancing risk reduction with costs and the greater impact that ATP would have on operations and maintenance. "We identified the fact that an existing train protection and warning system being rolled out already provided a huge amount of safety mitigation anyway. So we moved it from being purely a safety project to being an overall railway project." Once again, the idea was to make the whole signalling system more modern, safer and easier to maintain.

His work on the implementation of Uff/Cullum led to an invitation from Richard Bowker, then head of the Strategic Rail Authority, to become Executive Director, Technical. This job also involved Waboso's skills as a guitarist. Bowker is, says Waboso, a seriously good keyboard player. The pair were part of a group that entertained the staff at the Strategic Rail Authority's Christmas parties, a tradition that Waboso has continued at London Underground.

LINE UPGRADES

By now, Waboso was well acquainted with the importance of signalling in railway systems, a subject that he also went into in the Hinton Lecture of 2007 (also the year he was elected a Fellow of The Royal Academy of Engineering). "One of the things I have learned in railways is that you can't do anything about performance without involving the signalling."

Sorting out a history of old technology, including signalling, is one of the challenges of the current boom in railway

SYSTEMS MATTER

"Engineers do love to be in their own disciplines. They like to be a signalling engineer, a track engineer, a rolling-stock engineer, a lift engineer or a power engineer. Increasingly, we need to become systems engineers. A systems engineering module should be mandatory in all undergraduate courses."

When it comes to railways, it is the system that matters, "getting the trains and the signalling, the stations, the passenger flows and the customer information to work," says Waboso. "The other thing that we need to be better at is always putting the customer at the centre of everything that we do. Engineering excellence is fantastic, but it is only when that makes a positive impact on the customers in a cost-effective way that engineering really achieves its full potential."

modernisation in the UK. "The key thing is to take away all the line-side signals and to reduce the infrastructure." Maintaining infrastructure is a major part of the cost of running a railway network. If you can get rid of it and put intelligence on the trains, then you can reduce maintenance costs and enhance safety.

Almost all of London Underground lines are going to be upgraded over the next decade, to deliver the required 25% capacity increase, and automatic signalling is at the heart of it.

Getting the signalling, trains, power, track and other assets to work together with the people and processes to deliver to the required output is always, "the ultimate system challenge", says Waboso. "It is one we can and must deliver on."

OVERGROUND UNDERGROUND

When the Strategic Rail Authority was disbanded, Waboso was invited by Tim O'Toole to become London Underground's Director of Engineering. He then took overall control of the engineering that had consumed much of his working life for more than a decade. With an operating

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