



Addressing South Africa's engineering skills gaps

Engineering
skills gaps

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Abstract

Purpose – This paper aims to provide a case study of how engineering skills gaps are being addressed by Murray & Roberts in South Africa.

Design/methodology/approach – The paper focuses on skills challenges in South Africa from a reflective practitioner perspective, exploring a case example from an industry leader.

Findings – The paper explores how Murray & Roberts, within the context of the broader construction industry in South Africa, has addressed skills shortages with an integrated, multi-faceted approach with more general application.

Research limitations/implications – The integrated approach to labour mobilization and development proposed has been successful in addressing major infrastructure construction projects. Further research will be needed to establish its broader application.

Originality/value – The paper pragmatically addresses live skills challenges, exploring creative solutions to the scarcity of skilled construction labour experience.

Keywords Skills, Construction industry, South Africa

Paper type Case study

Introduction

Engineering skills shortages have been well documented (e.g. Grainge, 2005; *Engineer*, 2008). In the Republic of South Africa skills shortages across a range of market sectors is a pressing issue (Anderson, 2008; Mulder, 2007), with engineering and construction suffering particular constraints on growth and effectiveness. However, investment in infrastructure, in particular new power generation projects, is providing opportunities which must be grasped in order to develop capability for the future.

Murray & Roberts have 106 year history of delivering engineering and construction projects in South Africa. With revenues of 28 billion rand in 2008, the company's core competences are embedded within the construction industry, with particular strengths in the building and infrastructure; mining and industrial; energy, power and environmental sectors. Talent, and skills in particular, are an issue (Murray & Roberts, 2009, p. 13):

After more than two decades of investment decline, the profile of the engineering and construction industry in South Africa has been enhanced and demand for related human capital and leadership talent has increased. The primary challenge lies in the development of basic skills, the procurement and development of strategic and professional leadership and the protection of experience.

The decision by Eskom to commission the construction of the R 80 billion Medupi Power Station at Lephalale in Limpopo Province, the largest coal plant in Africa



(Modern Power Systems, 2007) and the similarly clean coal fired Kusile Power Station near Wibank in Mpumalanga Province has created a significant opportunity to develop power construction sector skills within South Africa. The scale of the build and project duration – Kusile Power Station will be completed in phases from 2013 (SouthAfrica.info, 2008) – provides the continuity necessary to take a medium-term view of skills development. This is of national importance, providing the opportunity to keep and develop a cadre of power builders, focused on this market with world-class experience.

This paper examines the background to skills shortages in the South African construction industry, issues facing engineering employers in recruiting and developing the young, the practical programmes in place to assess and develop adult workers, before proposing an integrated route forward.

Background

For construction industry businesses the skills shortage issue is real and potentially harmful. As the Economist Intelligence Unit country report for South Africa (Economist Intelligence Unit, 2008) states:

Skills shortages in particular remain a serious constraint in South Africa, although increasing amounts of public and private resources are being committed to address the problem. Private capital will be sought for infrastructure projects, especially energy...

Such skills shortages are so critical to the development of the economy that they are high on the political agenda. A number of government initiatives are in place to help address education and skills challenges, but corporations are necessarily focusing on developing their people in order to build the talented, high skill workforce required to capitalize on the opportunities for growth that are available, a point taken up by Newman *et al.* (2008):

Today, organizations in South Africa place a strong emphasis on developing skills to deal with the paradox of high unemployment and a skills shortage. Organizations are required to conduct skills surveys to determine the education levels and the potential for development in their people, and to put skills development plans in place. Money companies pay into the Skills Levy (to the Receiver of Revenue) can be claimed back when suitable training is implemented.

Within the South African engineering and construction sector there is a strong sense that every company is facing up to the same challenge, that of severe skills shortages, especially among artisans and supervision. The problem is made worse by the shortage of skilled instructors.

Given high levels of unemployment (26 percent nationally in 2006, but possibly nearer 40 percent once account is taken of those no longer seeking work) there are high expectations for local employment wherever major projects are based. Unfortunately skills levels tend to be low; limiting the scale of local hiring that is practicable.

Solutions are being found in assessing and developing skills among the local workforce. However, a combination of core company workers, with local hires, augmented by overseas labour to plug the skills gap has been the reality and will continue to be for the short-to-medium-term. A key challenge is the need to be committed to generating wealth and skills while managing local expectations.

Attracting and developing young talent

These challenges need to be addressed with concerted effort. Globally engineering has had an image problem among the young (e.g. O'Donnell *et al.*, 2008). The same is true in South Africa where in recent years industries such as banking and information communications technology (ICT) have been more fashionable options for graduates and school leavers.

This is a global concern. The conclusion of a seminar series in the East Midlands region of the United Kingdom, for example, reported by Dainty *et al.* (2005), would ring true in South Africa and elsewhere:

It was argued that efforts to create a sustainable future supply of indigenous skills must begin with a robust campaign to promote the industry, its occupations and its careers.

As a responsible employer, Murray & Roberts is addressing in an extensive process of collaboration with schools, colleges and universities, including promoting the development of skills in mathematics. Building and maintaining a talent pipeline is crucial. It is a process that includes bursary payments and job experience that is not just confined to the South African home market (Murray & Roberts, 2009, p. 23):

Murray & Roberts is not immune to the engineering and technology global skills deficit, which is experienced across all our businesses and projects globally. We have increased our bursary intake at universities and our on-the-job training programs are making a significant contribution to building the skills pool in South Africa, Canada and Australia.

The development of “learnerships” has been important. These are not just aimed at the young – people from 16 – 60 are encouraged to join one (Schussler, 2006). These programmes combine theory with practice and, focusing on learning outcomes, ensure substantive exposure and practical grounding in the world of work for school leavers, new graduates and others.

The Medupi and Kusile provide substantive opportunities for learnerships to be completed on one project, together with the transition into qualified craft roles. Too often experiences have been fragmented given the nature of the industry. The attitudes towards the industry among the young will continue to need to be addressed, but these projects have provided a higher profile for the sector and generated interest accordingly. The Gautrain transportation project in Gauteng Province has had a similar effect. Engaging the young will be crucial to the future of the industry. Their discipline and attitudes at work, which can manifest itself in absenteeism, will need ongoing attention.

Skills development among mature employees

Significant opportunities exist to develop more mature workers already active in the workforce. It is a larger pool to draw upon and good work habits may have been established. Skills levels can be low however, but innovative approaches provide the opportunities to tap into this source of skilled labour, and develop pride in workmanship on a larger scale. It is particularly important to be able to develop older workers when recruiting from localized communities.

Advanced Artisan Training provides a route into skilled work for mature talent. It essentially provides an accelerated apprenticeship with 24 weeks of taught theory combined with 54 weeks of practical work on site.

Department of Labour skills programmes have an important role to play. Their task specific vocational programmes are useful in up-skilling or re-skilling workers. All initiatives have required a focus on recognition of prior experience and learning, a process which has long played an important role in accrediting levels of skills and learning in South Africa. Recognition of prior learning (RPL) was the focus of a National Training Board report which defined it as (Harris, 1994):

a way of recognizing what individuals already know and can do. RPL is based on the premise that people learn both inside and outside formal learning structures (including learning from work and life experience) and this learning can be worthy of recognition and credit.

It is a significant building block in many adult learning programmes. Its role in “grandfathering” artisans with experience but no qualifications is key. It is a vital tool in “brush-up” programmes for those who have not had the opportunity to practice their skills and, although they have some qualifications cannot meet required standards due to the fragmented nature of their project-based employment. Sustained employment with the ability to continuously practice skills is rare.

Most commonly RPL is assessed in the form of practical tests. In brush-up programme testing experiences at Murray & Roberts reveal that only two out of ten will pass. Those performing reasonably well, although not meeting the standards can then be put through an appropriate trade school experience to brush up their skills.

An integrated approach to bridging skills gaps

At Murray & Roberts an integrated approach has been adopted to bridging gaps in skills:

- the company’s core, highly skilled workforce is mobilized to lead construction projects;
- the South African labour market is accessed to augment the core team with skilled artisans;
- the local labour force (local to the project location) provide a pool from which to recruit and up skill;
- skilled foreign workers are brought in to plug any shortfalls in South African skilled labour;
- young people are brought into the workforce, often through learnerships, and gain experience on the project; and
- Advanced Artisan Training and other programmes are essential to up-skilling workers.

This integrated approach provides a labour force mix in which projects can be effectively delivered today, while indigenous skills to provide bench strength for the industry are developed for the future through experience, training and education.

Foreign workers are an essential element within the mix; the skills shortages in South Africa are so acute. The South African Government has moved to make the mobilization of overseas labour easier through the introduction of block visas. However, in using foreign workers it is vital that engineered into their use is a skills transfer process to local workers.

In conclusion

Engineering and construction skills shortages, a global phenomenon, are particularly acute within South Africa. Infrastructure projects, particularly those in the power sector, provide a medium-term opportunity to seriously address these challenges and build a world-class skills base. Attitude changes towards the industry are needed among the young, and innovative skills development programmes need to be harnessed.

An integrated approach to mobilizing and developing workers, practiced by Murray & Roberts provides a model for the delivery of infrastructure projects while developing the next generation of skilled workers. The opportunities to scale-up and skill-up provided by current large-scale projects should not be missed.

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