

skills for infrastructure delivery in south africa

the challenge of restoring the skills pipeline

a discussion document



public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA





The South African construction industry is just coming out of a significant phase of decline that has seen limited investment in human capital development and the migration of available skills, leading to shortages of skills in the industry. The announcement of a large government infrastructure spending programme in 2005, such as the construction of the Gautrain Rapid Rail Link and provision of infrastructure for the 2010 Fifa Soccer World Cup, have highlighted the skills shortages, and necessitated timely interventions to ensure the delivery of a number of infrastructure development projects.

In response to this need, the cidb, in conjunction with the National Department of Public Works, commissioned a project to quantify the skills currently available in the construction industry, estimate the anticipated skills required to meet this ambitious investment programme and lastly, estimate the shortfall and identify interventions for addressing the skills problem. This skills report is intended to portray the state of skills in the industry, identify the skills provisioning challenges and mobilise the industry to contribute to skills development. Many organisations, government departments, state-owned enterprises and private sector clients contributed to, and helped steer the investigation.

The report firstly quantifies the skills categories and numbers required to meet the projected infrastructure investment. It concludes that there will be a shortage of high level skills that require long periods of time to develop to the requisite competence levels, but can be sourced on the international market. It further paints a picture of an industry lacking in intermediate artisan skills that can be developed rapidly given significant investments and workplace exposure.

The traditional pathways used for the development of artisan and engineering skills in South Africa are then described, and the report concludes that there has been a significant breakdown in the skills development pipeline. It provides for short-term interventions to meet the current challenge and medium- to long-term solutions to re-establish the pipeline.

The skills report lastly makes recommendations on the establishment of sustainable pathways to facilitate the development of a pool of construction expertise, and identifies the key role-players responsible for taking these forward. The cidb, in partnership with key stakeholders, is facilitating that the recommendations are taken forward.

It is hoped that this report will make a significant and positive contribution to the body of knowledge and debate on the skills supply in the built environment in South Africa.

Minister AT Didiza, MP
Minister of Public Works
Pretoria, South Africa
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acknowledgements

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- Master Builders Association of South Africa
- Industrial Development Corporation
- South African Institute of Steel Construction
- National Business Initiative
- ESKOM
- TRANSNET
- SASOL
- Project Owner's Forum

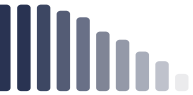
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The cidb recently undertook an investigation into skills for infrastructure delivery in order to contribute to the industry-wide debate as to whether there is likely to be a skills deficit in the construction and engineering fields as a result of the proposed increases in infrastructure investment over the next decade. In order to investigate the potential skills deficit, the cidb commissioned two studies, namely:

- Demand for skills - an analysis of the proposed infrastructure spending programme, undertaken by Andrew Merrifield (July 2006)¹; and
- *Current and potential skills in the infrastructure sector*, undertaken by Thabiso Consulting (July 2006).

In addition, the cidb interacted extensively with a range of stakeholders and other initiatives, including the Joint Initiative on Priority Skills Acquisition (Jipsa).

An overwhelming conclusion of this investigation is that a comprehensive challenge exists to restore or replace the skills pipeline that produces the wide range of skills required by the construction and engineering industries, in order that the country's longer-term infrastructure delivery objectives can be met.

This discussion document provides a synthesis of the cidb's investigation, namely:

- a summary of skills demand and supply;
- a summary of the key short- and medium-term skills challenges facing infrastructure delivery in South Africa;
- a summary of the challenges to the skills supply pipeline; and
- recommendations on a way forward.

"...as many as 90% of South Africa's consulting engineering firms are trying to employ skilled engineers, technologists and technicians but finding it hard to identify prospective candidates."

The Civil Engineering Contractor Bulletin
16 October 2006

¹ This document is available from the cidb, <http://www.cidb.org.za>.

2. the skills challenge: a summary

2.1 Overview

Formal employment in the construction sector decreased progressively in the 1990s until the low of 2001 when the industry had lost more than 200 000 jobs. An increase in infrastructure investment since 2003 has seen a steady increase in the number of jobs created and the accompanying challenge to secure requisite skills. This challenge has been exacerbated in recent times by the announcement of the Gautrain, infrastructure for the 2010 FIFA World Cup and government's R372bn infrastructure investment programme. The strong focus of the EPWP on labour intensive construction also places extra demands for qualified supervisors and managers.

Historically, as evidenced by graduation rates in construction and engineering, skills development has always lagged behind increases in construction spend. While it is reasonable therefore to assume that industry will respond to meet the growth in skills demand, this current growth phase requires substantive interventions involving a wide range of stakeholders, because:

- the current growth in infrastructure investment has come on the back of lows in the industry that have not been experienced for decades;
- labour practices of the past decade have resulted in fundamental structural changes favouring labour brokering, resulting in declining investments in skills development; and
- there have been fundamental changes, and breakdowns, in the skills-supply pipeline.

2.2 Skills Demand and Supply

From a demand perspective, the cidb first investigated the likely level of infrastructure investment², from which it concluded that the growth in infrastructure investments is likely to be around 10% to 15% per annum over the next five years. The investigation then assessed the skills requirements of different project types, including building, minerals processing, bulk earthworks, roads and stormwater, and water

Boom promise may fade on lack of skills

Eskom chief economist Mandla Maleka says government has to provide an environment for a bigger pool of skills "even if it is regulatory", to plug the gap.

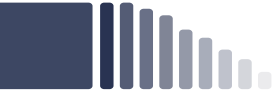
The skills shortage is considered so serious it could sabotage the Accelerated and Shared Growth for SA initiative. Deputy President Phumzile Mlambo-Ngcuka, who is driving the initiative, has alluded to this: government's R372m infrastructure investment between now and 2009 is expected to stretch the country's skills pool to the limit.

Business Day
13 June 2006

Case study: Non-residential building

Skills category	Additional skills requirements	Experience requirements
Contracts directors	60	10 to 20 years
Contracts managers	120	2 to 5 years
Site agents	230	2 to 5 years
Site engineers	700	2 to 5 years
Foremen	230	2 to 3 years
Junior foremen	350	2 to 3 years
Shutter hands	1 200	3 to 12 months
Rebar hands	1 200	3 to 12 months

2 Demand for skills - an analysis of the proposed infrastructure spending programme, undertaken by Andrew Merrifield (July 2006)



and sanitation. It applied these profiles to understand the skills demands in the building and civil engineering sectors and indicated that, if demand in these sectors were to reach a projected 10% growth rate over a five-year period, the following demand for skills was obtained:

- for key management, supervisory and engineering personnel: less than two hundred in most categories over a five-year period; whilst
- for key artisans; between two to three thousand in the most populous categories over a five-year period.

An analysis of the supply of skills in the learnership, further education and training (FET) and higher education and training (HET) sectors³ shows that increasing numbers of learners are entering training institutions - which could suggest that the supply should more than adequately cover the increased demand over the next five years. However, taking into account the low throughput ratios, lack of access to experiential training for qualification purposes and non-accreditation of certain curricula (to be discussed in Section 3), together with normal attrition rates as well as changes in work processes, the ability of the supply pipeline to meet the required demand is far from certain.

In order to interpret the additional demand for skills, and to place the skills challenge in context, it is necessary to differentiate between scarce skills and critical skills:

- the term “scarce skills” refers to those skills which are in short supply but which can be obtained through short-term targeted training (such as many artisan skills); while
- “critical skills” refers to particular high-level skills within certain occupations (e.g. experienced contract managers, high-quality metallurgical welders).

“...increasing numbers of learners are entering training institutions - which could suggest that the supply should more than adequately cover the increased demand...”

From the case studies undertaken, it can be concluded that the largest demand for skills is in the scarce skills categories, which can be met through short-term targeted training. Critical skills, on the other hand, are required in much fewer numbers, but require up to 10 to 20 years of experience.

2.3 Short- and Medium-term Challenges

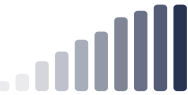
Arising from the above, and before any discussion on the challenge of restoring the skills pipeline, it is appropriate to provide a summary, or synthesis, of the short- and medium-term skills challenges facing infrastructure delivery in South Africa as indicated by the cidb's investigation.

- Short-term challenges:* In the short term, a number of immediate challenges exist in the sourcing of particular expertise to ensure that infrastructure projects, and in particular certain mega-projects (primarily in the public corporation sector), are rolled out as planned. These scarce skills shortages may slow progress in the design and construction of specific projects, and are also likely to impact on the maintenance of existing infrastructure as well as on the delivery of basic services.

The concern pertaining to scarce skills shortages is heightened by the fact that, apart from the planned mega-projects, existing construction and engineering operations are working to capacity owing to the fact that the industry has been expanding over the past five years. This has resulted in a rise in costs, and has had an impact on quality.

3 It must be noted that significant difficulties exist with regard to obtaining accurate and reliable data on the skills supply. These difficulties include:

- significant gaps in data-tracking and general statistics;
- absence of accurate and up-to-date information;
- lack of time series data which enable us to trace trends over time, especially with regard to sector or target group-specific data; and
- inability to disaggregate national-level data, and the corresponding lack of specific output signals that are meaningful to planners.



Relating to critical skills, there is a significant shortage of experienced managers, engineers, supervisors and qualified artisans that is threatening to stall service delivery unless ameliorated delivery systems are instituted, in concert with supporting interventions which can assist in bridging the current gaps. In the public sector these shortages are reflected particularly at the point of delivery in local government. Equally, these challenges are also reflected in the private sector where, for example, the lack of experienced site managers is seen to be undermining delivery in terms of expected time, cost and quality requirements.

ii) *Medium-term challenges:* In the medium term, a comprehensive challenge is to restore or replace the skills pipeline that produces the wide range of skills required by the construction and engineering industries. This is vital as it is suggested that, even if the construction and engineering industries can overcome the short-term challenges by re-organisation and targeted HR interventions (including focused training programmes, internships and mentoring), as well as by importing scarce skills, their ability to do so will decline over the next five years unless new capacity and skills are developed in the interim.

2.4 Public-Sector Delivery Capacity

A related issue that must also be addressed is that of client delivery capacity, and specifically public-sector delivery capacity. While there may be sufficient numbers employed, many of the individuals in the sector lack the critical skills, knowledge and experience to effectively manage and ensure the delivery of infrastructure in terms of requisite standards of cost, quality and time. Such capacity constraints are all the more important given that the public sector (other than public corporations) contributes around 60% to the government's R372 billion infrastructure investment target - which is more than double the existing public-sector investment!

An analysis of public-sector capacity points to the high turnover in the public sector (national and provincial), both for engineering professionals and administration/clerical workers. The turnover rate for clerks is also a

Artisans shortage to be curbed in Gauteng

The Gauteng Department of Public Transport, Roads and Works, through its Impophoma Infrastructure Support Unit, have [sic]explored a way to curb artisan shortage in the province in the near future.

The 5 000 Artisan Project is aimed at alleviating the projected skills shortage in the artisan field as well as creating job opportunities for the unemployed, especially those under 35 years of age.

Gauteng Provincial Government
10 November 2006
<http://www.gpg.gov.za>

The best indication of the impact of capacity constraints is that, by the end of 2005, construction costs had increased by almost 85% compared to the general Producer Price Index (PPI) increase of 40% since 2002 (and prior to that they had actually lagged the PPI). It is also evident that, although construction material costs have risen significantly higher than other production costs (60% as opposed to 40%), it is the other construction costs (notably person-power, professional fees and profit and overheads) that have grown even more quickly. Unless serious efforts are made to address capacity constraints in the medium term, these cost escalations are likely to stifle growth going forward.


Demand for skills - an analysis of the proposed infrastructure spending programme undertaken by Andrew Merrifield (July 2006)

Industry initiative to address skills requirements

The South African Federation of Civil Engineering Contractors (SAFCEC) Centre of Excellence based at the Boland FET College in Paarl in the Western Cape is an example of innovative student-centred learning initiated by industry to address the skills shortage. It is a public-private partnership between private construction companies (led by Power Construction), a public FET college and a private technical training provider (Tjeka Training Matters (Pty) Ltd). The private construction companies support the learners through full-time employment and access to workplace training.

The initiative has been endorsed as a Centre of Excellence by CETA.





matter of concern, given the large number of contracts that have to be processed, especially arising from the requirement to use SMMEs. It is likely that a high turnover in administrative workers will exacerbate the administrative burden in the system and the likelihood that inefficiencies will develop.

Furthermore, of great concern is that almost 40% of the senior officials and managers have five years or less experience in the public sector.

Given that the bulk of the projects arising in the Government sector are of relatively straightforward and limited scope, there is an abundance of smaller firms of consultants and contractors who can undertake such projects. Many of these smaller firms are developing black- and women-owned firms - several of which are however struggling to meet contractual requirements (cost, time, quality). Contractor-development programmes and contractor and consultant registration can address many of the current problems. Central to this approach (and skills creation in general) is the need to ensure that firms that perform get the opportunity of consolidating and growing their capacity through continuity of work.

Packaging of projects into large multi-year contracts can address the critical skills shortages in the public sector (especially at local government level) because the client would require fewer skilled and experienced people to procure, manage and administer a smaller number of contracts. The economies of scale achieved by such contracts can also bring about greater efficiencies in the professional inputs required in the design and supervision of construction works, as well as in the on-site management of the works. This will in turn increase the capacity of consulting practices and contractors alike.

The economies of scale in large multi-year contracts can also be used to establish coherent mentoring programmes which are integrated into the contracting arrangements, and thus accelerate contractor development.

“...large multi-year contracts can also be used to establish coherent mentoring programmes which are integrated into the contracting arrangements...”

Standardisation in procurement documentation, designs specifications, procurement, pricing, contracting and targeting strategies within particular infrastructure programmes can also bring about significant efficiencies in the time and cost of the delivery of projects, and improvements in project outcomes, all of which will significantly reduce the internal and external professional inputs required to deliver projects.

An alternative approach to that of packaging projects into large multi-year contracts is to consider systems such as the programme-management approach being developed separately by the cidb and the KZN Department of Works.⁴

Such programme-management systems would alleviate many of the perceived skills deficits in infrastructure delivery at local, provincial and national government. Coupled to the programme-management approach could be a system such as the “Gateway” system operated by the Office of Government Commerce (OGC) in the UK, whereby all government agencies are required to follow a procedure which requires all new initiatives (but especially capital projects) to go through a rigorous screening process that determines the level of support that those agencies will get from the OGC to manage the infrastructure design, procurement and delivery process.⁵ Such processes, coupled with a programme-management approach, would dramatically reduce the risk of poor delivery and at the same time better utilise scarce expertise within the public sector.

4 See Ron Watermeyer's *Procurement Models Relating to a Programme Management Approach* and the KZN Department of Works *Creating an Organisation of Excellence*.

5 See, for instance, the OGC's *Gateway to Success*.

3. the skills-supply pipeline

3.1 Introduction

Challenges relating to the skills pipeline cut across the education, training and workplace arenas. The problem is not merely to equip new entrants with skills, but to ensure that they gain the appropriate workplace experience to consolidate their craftsmanship, supervisory and professional capabilities. A further challenge is the predominance of an aging skills population which needs to be replaced without compromising quality and performance.

Addressing the skills pipeline will require significant changes in the current system of education and training to ensure that graduates (whether artisans, technicians or technologists) are able to meet world-class standards of performance.

3.2 An Overview of Supply Pipeline

Training and skills development in the construction and engineering sector are provided through three major pathways of learnerships, further education, and higher education and training. An overview of these pathways is given below:

i) *Learnerships*: A learnership is a training pathway introduced under the National Qualifications Framework. It combines theoretical training at a college, or through a private training provider, with relevant on-the-job training. In order to enrol for a learnership a candidate has to be contracted to an employer who will provide practical on-the-job training.

Construction-related learnerships are administered by the Construction Education and Training Authority (CETA) which regulates the types and levels of training, undertakes quality assurance, and accredits training service providers. The CETA is also responsible for financing learnerships through skills levies collected from employers.

ii) *FET training*: Artisan training takes place in the further education and training (FET) band. Learners receive theoretical education in foundational mathematics, science, basic

“...construction and engineering professions are often not regarded as a first career choice by many learners, owing to a combination of the image of the industry and the lack of attractiveness...”

communication, and the respective technical subjects. The practical component of the training is introduced as simulated learning in colleges, with the learners expected to advance their practical training at their places of employment.

Further education programmes produce artisans who should later become supervisors and foremen in their chosen careers and areas of specialisation.

iii) *HET training* is provided by the universities of technology and universities.

- *Universities of technology*: The universities of technology (former technikons) offer technician and technologist-type programmes. In this stream learners undergo theoretical training at the colleges, and have to complete a six-month experiential learning period with an accredited employer to graduate. Graduates have to register with professional councils to practise as engineering technologists and technicians. The major challenge to this pathway is that many learners fail to secure the experiential learning component and therefore cannot complete their studies and qualify.

- *University*: Universities provide engineering-type programmes where learner enrolment is dependent on obtaining passes in higher grade mathematics and science. Most engineering programmes are four years long and upon graduation learners have to register with the respective professional councils to practise as engineers.



3.3 Challenges to the Skills Supply Pipeline

The construction and engineering skills supply pipeline has been plagued by a number of systemic challenges which have impacted on the productivity and quality of outputs in the sector. Each of these is discussed briefly below.

i) *Input issues:* The national pass rate in mathematics and the unattractiveness of the industry to prospective learners are adversely affecting the input into the skills supply pipeline:

- *National pass rate in mathematics:* Learners require higher grade mathematics and science to be able to enrol in construction and engineering programmes for HET courses. The overall national university-entrance pass rate in mathematics and science for the higher grade was about 3% in 2004. These low numbers of matriculants with higher grade mathematics and science, as well as competition from other science and financial sciences programmes requiring the same entry level requirements, significantly affects the number of potential entrants to the industry.
- *Attractiveness of the sector:* The construction and engineering professions are often not regarded as a first career choice by many learners, owing to a combination of the image of the industry and the lack of attractiveness of the industry in recent years. Specifically, the stressors within the contracting sector (physical demands, long hours, remote sites and the nomadic lifestyle) mean that very few young people regard it as a career of choice. For example, in a study conducted in the Western Cape only 4% of Grade 12 learners expressed interest in pursuing studies in construction-related disciplines.

Furthermore, engineering training provides learners with analytical skills which are highly sought by the financial services and other sectors - resulting in a loss of qualified professionals to the construction and engineering sectors.

ii) *Institutional issues:* Historically, artisan training was offered through a collaborative pathway between employers and training institutions. The trainee was appointed and tenured with an employer as an apprentice getting practical experience under the guidance of an experienced artisan. The trainee received theoretical instruction at either the Building Industries Federation of SA (BIFSA) or South African Federation of Civil Engineering Contractors (SAFCEC) training institutions or FET colleges. To qualify as an artisan, the trainee had to take a trade test and receive a Certificate of Competence. This training system changed with the promulgation of the Skills Development Act No 97 of 1998, which provided for the establishment of Sector Education and Training Authorities (SETAs). Specifically, the BIFSA and SAFCEC training institutions were scaled down around the late 1980s due to industry changes such as the rise in trade unions and labour regulation, but both the Master Builders South Africa (MBSA) and SAFCEC are currently investigating the reintroduction of training institutions.

The Construction Education and Training Authority (CETA) was established in April 2000 by way of the Skills Development Act. Its primary objective is "to strategically influence the course of training and skills development by ensuring that all training reflects current sectoral needs and requirements of the construction sector"⁶. CETA does not carry out the training, but accredits and monitors training provided by private accredited training providers.

Current CETA-supported training programmes have failed to respond to the needs of industry. Of the 6 814 learnerships registered in 2004 only about 10% (641) were at NQF Level 4 or higher (the targeted level for artisan level training). Anecdotal evidence suggests that much of the levies claimed back is actually claimed for soft skills and short courses that are not significantly impacting on the real skills deficit.

A clear concern of industry is the capacity of the CETA to manage the training system and

6 CETA; <http://www.ceta.org.za>



support the development of skills required by industry. A further concern with employers pertains to the bureaucracy required to access training providers and claim back the skills levy paid to the CETA. Consequently many large employers have had to resort to funding their own training to meet their business imperatives.

iii) *Quality and relevance*: The quality and relevance of training and particularly of learnerships and FET college programmes is adversely affecting the skills supply pipeline.

- *Learnerships*: CETA records indicate that, as mentioned, in 2004 there were 6 814 registered learnerships with the majority of learners in Construction Contractor Level 2 and Community Homebuilder (functional) Level 2. These levels of training are very basic and do not make any significant contribution to the specialised artisan skills required by industry. It therefore means that all future training has to reflect industry needs and contribute to building critical and scarce skills.
- *FET colleges*: Industry has raised concerns about the quality and relevance of both the practical and theoretical training that learners receive at FET colleges, citing both the qualifications and workplace experience of the teaching staff as a concern. Plans are, however, now under way to promote cross-pollination between FET colleges and industry to advance the quality of curricula and improve programme relevance. The new Vocational Certificate is the first product of these interventions.
- *Throughput rates*: The quality of learners entering construction and engineering programmes is also recognised as a challenge to skills development. Academic institutions point to the critical skills and attitudes of matriculants, irrespective of their matric passes, as often being unsuitable for the rigour required in engineering studies. This mismatch results in high attrition rates, where students change their

studies mid-stream, and subsequently low throughput rates in engineering programmes.

Although less easily quantified, the capability and extent of preparedness of academic staff to instruct a new generation of learners is also a factor impacting on the throughput rate.

Furthermore, the quality and state of repair of teaching infrastructure at some of the institutions influences the performance of learners with limited prior exposure to technological infrastructure.

FET capacity-building through public-private partnership


A new three-year National Certificate (vocational) has been developed by the Department of Education in partnership with the five listed construction companies (Murray & Roberts, Aveng (Grinaker-LTA), WBHO, Group Five and Basil Read) to develop key staff for the industry. The Building and Civil Construction programme will be introduced as a pilot in two FET colleges in 2007, namely in Northlink College in Belhar, Cape Town, and Tshwane South College in Atteridgeville, Pretoria. The initiative is being facilitated by the National Building Institute (NBI), which is also a technical adviser to the partnership.

The private companies will assist the FET colleges in learner recruitment and selection, recruitment and in-service development of lecturing staff, procurement of equipment and consumables, external assessment of students and placement for students who complete the programme. The companies will also assist students with bursaries and opportunities for experiential training during the three-year course.

The FET colleges will in turn be responsible for developing their sites and staff to offer the high-level programme.

On completion of the three-year programme, students will be eligible to become supervisors on construction sites after gaining further training and practical experience.

<http://www.safcec.org.za>



The difficulty of attracting and retaining highly qualified but relatively poorly remunerated academic staff makes increasingly difficult the challenge of radical improvement of throughput rates.

Specifically, the cidb skills study revealed that the average throughput rate for universities and universities of technology for 2004 was 14% for undergraduate programmes. This is attributed to the poor preparedness of matriculants for the rigour of university life, their newly gained freedom and poor academic support in the respective institutions.

- *Accreditation:* Pre-2000, universities were completely autonomous in the determination of their programme content and quality, and professional councils such as the Engineering Council of South Africa (ECSA) provided much-needed checks and balances to the quality and international acceptance of programme offerings. The former technikons, on the other hand, had all their programmes accredited by the Certification Council for Technikons (SERTEC).

The SAQA Act of 1995, however, facilitated the establishment of the Higher Education Quality Council (HEQC) to accredit the quality of all programmes offered in higher education.

Of concern now is that some programmes accredited by HEQC are not accredited by ECSA, resulting in some universities and universities of technology offering non-ECSA accredited programmes to their learners. Learners attending such non-accredited programmes cannot therefore register or practise as professionals in their chosen careers. This results in wastage for the learner and the higher education system as a whole.

The HEQC and ECSA signed a Memorandum of Agreement in November 2006 to mutual accreditation; and it is hoped that other professional councils will follow ECSA's example.

"...in 2004 there were 6 814 registered learnerships with the majority of learners in Construction Contractor Level 2..."

- iv) *Experiential learning:* Historically, artisan training required theoretical as well as practical learning components. The theoretical component was offered by FET colleges, and trainees entered into employment contracts with the company that hosted their practical training. (The company in turn received a tax benefit.) The apprentice would then practise his/her trade under the supervision of a qualified artisan. Upon completion of the training the trainee would write a trade test and get a Certificate of Competence.

The learnership system introduced new SETA-driven and funded training pathways, and removed the tax benefit which was replaced by a refund on the skills levy. Under this system theoretical training is provided by CETA-accredited training providers and the learners are required to find jobs to obtain their practical training.

Specific issues that have arisen with experiential learning include:

- In an environment of decreasing investment in construction, together with the widespread use of labour brokers, it has not been possible for many learners to get the necessary practical training experience to complete their studies, and hence to get the relevant qualification. This is compounded by the project-specific nature of construction, which means that contractors are often either unable to continue to employ learners or unable to provide access to diverse types of work that would support a rounded qualification.
- The widely publicised financial challenges facing the CETA have also resulted in the inability of contractors to access any funds to support learnerships. Subsequently little effective training has taken place in the industry.

4. recommendations

In the short term the construction and engineering industries can overcome the immediate challenges by re-organisation and targeted HR interventions (including focused training programmes, internships and mentoring), as well as by importing scarce skills. However, industry's ability to cope will decline over the next five to ten years unless new capacity and skills are developed in the interim.

The following recommendations map out a framework of activities required to address the medium- to long-term challenge to restore or replace the skills pipeline, as well as other challenges raised in the investigation.

4.1 Restoring the Skills Pipeline

- i) *Increasing the number of mathematics and science graduates at Grade 12 level* requires ongoing interventions by the Department of Education. Programmes such as the Department's *Dinaledi* programme are already addressing the quality of maths and science education. However, these need to be strengthened and their geographic reach increased to some of the more rural provinces.
- ii) *Improving the attractiveness of the industry* requires ongoing interventions by the Department of Public Works, as well as by industry and professional associations. Specifically, the Department's *National Construction Week* initiative needs to be maintained and strengthened - including enhanced support by industry.
- iii) *Improving the quality and relevance of current training programmes* (particularly learnerships and FET college programmes) can be achieved through the following interventions:
 - Improving the quality of FET and HET programmes that are currently not recognised by the relevant professional bodies requires interventions by the Department of Education/HEQC and professional councils to ensure that they are able to attain registration status and support interventions to enable these learners to attain the requisite experience so that they can complete their programmes.
 - Enhancing the capacity of higher education institutions and FET colleges to address the facilities and infrastructure requires interventions by the Department of Education (current initiatives include the FET recapitalisation programme).
 - Enhancing the capacity of higher education institutions and FET colleges to address the qualifications and workplace experience of teaching staff requires interventions by the Department of Education supported by industry through, for example, mentoring programmes and hosting sabbaticals.
 - Addressing concerns about the quality and relevance of both the practical and theoretical training that learners receive

"Improving the attractiveness of the industry requires ongoing interventions by the Department of Public Works, as well as by industry and professional associations..."

Department of Education

Department of Public Works, industry and professional associations

Department of Education, HEQC and professional councils

Department of Education

Department of Education and industry

requires interventions by the Department of Education supported by industry (current initiatives include the introduction of the new National Vocational Certificate).

- A focus by CETA on funding learnerships that are relevant to artisan skills required by the industry and not Level 2 learnerships.
- iv) *Strengthening funding mechanisms for learnerships that support experiential training that is of sufficient duration* to meet qualifications criteria for artisans requires direct interventions by:
- The Department of Labour and CETA to fund programmes that are of a longer duration and in which there is continuity of work experience, regardless of whether these are learnerships or apprenticeships.
 - Industry, putting in place training, mentorship and internship programmes to improve the level of critical skills, including skills and competencies that can be acquired only through workplace exposure and experience.
- v) *Increased and diversified funding* to contribute to improved skills development. The Department of Education-NBI partnership for FET college recapitalisation is an initiative which aims to improve the skills-training infrastructure and attract learners to technical fields. Other efforts include Jipsa's recommendations for the Department of Education to increase funding to universities to facilitate the training of an additional one thousand engineers per year. These initiatives need to be supported and strengthened.
- vi) *Restoring the experiential learning system* to create a skills-supply pipeline requires interventions to resolve:
- the legal and administrative hurdles of placing learners;
 - access to multiple workplaces, together with appropriate mentorship to ensure access to appropriate training;
 - appropriate funding mechanisms and incentives; and
 - the accessibility of appropriate training infrastructure.

In support of this, the cidb is currently investigating the feasibility of the establishment of an Employment Skills Development Agency (ESDA) to manage the legal and administrative hurdles of placing learners with multiple workplaces to ensure access to appropriate training as required. The flexible ESDA model, by acting as a lead employer and coordinating workplace experience, can ensure that individuals are moved across projects and are able to have continuity in learning - and in this way develop the requisite experience and competence. This would suggest that its role would extend beyond learnerships and would focus on all programmes in which learners require work experience.

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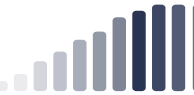
CETA

Department of Labour and CETA

Industry

Department of Education and industry

cidb, CETA and industry



The ESDA framework will also make proposals on funding mechanisms which are able to take these interventions into account and are designed to specifically support these interventions. This also requires a streamlined mechanism to enable the relevant parties to access this funding as current processes to access funding are in many cases prohibitively long and complicated. Vivally, this suggests the need to ensure that the CETA is able to effectively use its funding, as well as additional resources available through the NSF, to support these priorities and take decisive action. This implies that there is a need to support the current interventions being undertaken to strengthen the CETA and a need to review whether these are enabling the CETA to effectively and efficiently support the programmes that are prioritised in this document, as well as in relates processes such as the Jipsa process.

4.2 Public-Sector Delivery

i) *Enhancing public-sector delivery* requires ongoing interventions by the cidb, supported by other relevant government departments, focusing on changes in procurement and delivery systems to address current weaknesses through (see Section 2.4):

- ongoing support to capacity-building initiatives;
- standardisation in procurement documentation, specifications, procurement, pricing, contracting and targeting strategies;
- procurement strategies that enhance skills development;
- focusing on sustainability in contractor development through continuity of work, and not “spreading the sunshine”, including alternative delivery models such as packaging of projects into large multi-year contracts or the use of programme-management approaches; and
- support systems to manage the infrastructure design, procurement and delivery process (similar to the UK Gateway process).

4.3 Accurate and Reliable Data

i) *Maintaining accurate and reliable data* on supply and demand is a prerequisite for ongoing planning, monitoring and evaluation, requiring:

- ongoing rollout and implementation of the cidb's Construction Registers Service;
- interventions by the cidb, CETA, the Department of Labour and others for the development and maintenance of a detailed skills database; including
- tasking and mandating an institution to drive the data-gathering process, to be a repository for the data, and to be responsible for both the analysis of the data and making the result available to inform future decision-making and planning.

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