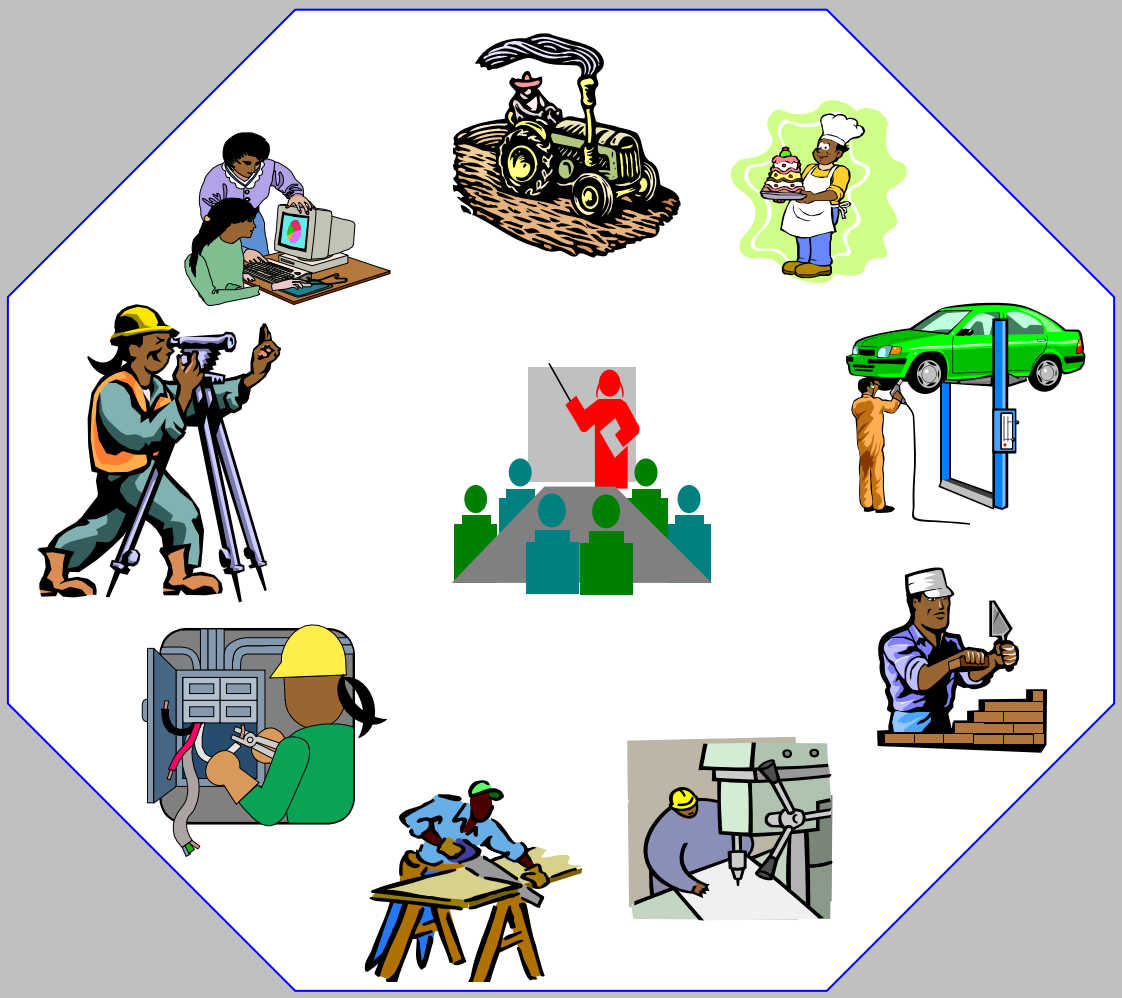
Federal Democratic Republic of Ethiopia

OCCUPATIONAL STANDARD

# CEMENT PRODUCTION TECHNICAL OPERATION

## NTQF Level III



*Ministry of Education*

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# Introduction

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standard (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF).They are national Ethiopian standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

- Occupational title, NTQF level
- Unit code
- Unit title
- Unit descriptor
- Elements and Performance criteria
- Variables and Range statement
- Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the respective occupation with all the key components of a Unit of Competence:

- the chart with an overview of all Units of Competence for the respective occupation including the Unit Codes and the Unit Titles
- the contents of each Unit of Competence (competence standard)
- occupational map providing the technical and vocational education and training (TVET) providers with information and important requirements to consider when designing training programs for this standards, and for the individual, a career path

## UNIT OF COMPETENCE CHART

**Occupational Standard: Cement Production Technical Operation**

**Occupational Code: IND CPT**

***NTQF III***

| | | |
|---|---|---|
| IND CPT3 01 0111<br>Analyze Refractory Failure | IND CPT3 02 0111<br>Monitor Central Control Systems | IND CPT3 03 0111\<br>Process Raw Material into Cement |
| IND CPT3 04 0111<br>Provide Coaching/ Mentoring in the Workplace | IND CPT3 05 0111<br>Use Structured Problem Solving Tools | IND CPT3 06 0111<br>Undertake Root Cause Analysis |
| IND CPT3 07 0111<br>Conduct Local Risk Assessment | IND CPT3 08 0111<br>Interpret Technical Drawing | IND CPT3 09 0111<br>Monitor Implementation of Workplan/Activities |
| IND CPT3 10 0111<br>Apply Quality Control | IND CPT3 11 0111<br>Lead Workplace Communication | IND CPT3 12 0111<br>Lead Small Teams |
| IND CPT3 13 0111<br>Improve Business Practice | IND CPT3 14 1012<br>Maintain Quality System and Continuous Improvement Processes | |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Analyze Refractory Failures** |
| **Unit Code** | **IND CPT3 01 0111** |
| **Unit Descriptor** | This unit of competence covers analyzing a refractory failure to determine failure mode. It involves understanding failure modes, differentiating different modes and understanding forensic procedures. |

| Elements | Performance Criteria |
|---|---|
| 1. Establish the suitability of resources | 1.1 Check all information conforms with resources<br>1.2 Record discrepancies in information<br>1.3 Report any inaccuracies in information to the person in charge<br>1.4 Identify and select materials, components, tools and equipment |
| 2. Analyze failure modes | 2.1 Identify spalling modes<br>2.2 Identify corrosion mode<br>2.3 Identify abrasion modes<br>2.4 Identify impact/compression/tensile modes |
| 3. Undertake forensic procedures | 3.1 Plan required investigation<br>3.2 Specify required test work/analyses<br>3.3 Interpret test results<br>3.4 Formulate simple reports |

| Variable | Range |
|---|---|
| Procedures | All operations are performed in accordance with standard procedures and work instructions. |
| Investigation | Investigation involves:<br>• collection of evidence, and may require the specifying of appropriate tests and the analysis of plant records and logs |
| Reports | The report should summarize:<br>• the nature of the failure<br>• the cause<br>• the methods used to determine this cause<br>• conclusions drawn and recommendations made |
| Occupational health and safety (OHS) | All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence. |

| Evidence Guide | |
|---|---|
| Critical aspects of Competence | Assessment requires evidence that the candidate:<br>• Demonstrated skills in investigation of a failure and developed evidence based conclusion as to the failure mode. |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• basis of various failure modes<br>• organization of simple test work programs<br>• make appropriate judgments on results<br>• reporting results in report format |
| Underpinning Skills | Demonstrates skills to:<br>• observing workplace procedures<br>• identify and solving problems<br>• working in a team or individually as required<br>• reading and numeracy to interpret workplace documents and technical information |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:<br>• Written Test / Oral Questioning<br>• Observation / Demonstration |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

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| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Monitor Central Control Systems** |
| **Unit Code** | **IND CPT3 02 0111** |
| **Unit Descriptor** | This unit covers the monitoring of a centralized control system. These controllers use a range of control algorithms and multiple control loops. The panel will control multiple plant items and or products. It will typically be located off plant in a control room |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for work | 1.1 Identify work requirements<br>1.2 Identify and control hazards<br>1.3 Coordinate with appropriate personnel |
| 2. Use operator interface | 2.1 Use keyboards, track ball and monitor and/or stand alone controllers to access control system/panel<br>2.2 Monitor the process using the operator interfaces<br>2.3 Select appropriate controller modes<br>2.4 Access historical data and information<br>2.5 Acknowledge messages and alarms |
| 3. Access control information | 3.1 Obtain relevant data and information from the control system by applying systems knowledge<br>3.2 Identify the status of individual pieces of equipment from the control panel and use information to identify potential faults<br>3.3 Minimize fluctuations and variations in process through the interpretation of existing trends and control schematics<br>3.4 Record process variations/irregularities to procedures |
| 4. Control process variations and monitor operations | 4.1 Use historical data to assist in the identification of problems<br>4.2 Process available information to identify potential faults<br>4.3 Undertake required set point/output changes to meet plant and process requirements<br>4.4 Optimize plant operating conditions in accordance with guidelines<br>4.5 Adjust production in response to test results and control panel information |

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| 5. Monitor operations | 5.1 Monitor key process and environmental variables and take appropriate action<br>5.2 Adjust controller settings in accordance with procedures<br>5.3 Use fine tuning software as appropriate<br>5.4 Coordinate with upstream and downstream units as appropriate<br>5.5 Record adjustments and variations to specifications / schedules<br>5.6 Communicate to appropriate personnel as required |
| 6. Facilitate planned and unplanned process start-ups and shut-downs | 6.1 Select and apply procedures to planned startup and shutdown processes<br>6.2 Select and apply procedures to unplanned shutdown processes<br>6.3 Implement all required emergency responses<br>6.4 Communicate necessary information to all personnel affected by events<br>6.5 Log all required information. |
| 7. Respond to alarms or out of specification conditions | 7.1 Identify system(s) affected by the alarm or condition<br>7.2 Interpret alarms and prioritize actions to be taken<br>7.3 Take appropriate action to respond to the alarm or incident<br>7.4 Deal with any out of specification material in accordance with procedures<br>7.5 Communicate the problem/solution to appropriate personnel<br>7.6 Record the information as required<br>7.7 Provide details of the alarm and action taken to the next shift at change over |

| **Variable** | **Range** |
|---|---|
| Codes of practice/ standards | Where reference is made to industry codes of practice, and/or National/international standards, the latest version must be used |
| Context | This unit of competence includes all such items of equipment and unit operations which form part of the control system. For your control room this may include (select relevant items):<br>• process control systems, e g Distributed Control Systems<br>• personal computers<br>• printers<br>• fire and gas detection/protection systems |

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| | • emergency shutdown systems<br>• communications systems<br>Typical problems for your plant may include:<br>• loss of power/utilities<br>• analyzing failure modes<br>• variation/loss of feed<br>• unstable control of pressure, temperature level and flows<br>• control equipment failure<br>• process plant trips<br>• change in atmospheric conditions (rain, temperature, wind, lightning)<br>• emergency situations |
| Alarms or abnormal conditions | Alarms or other abnormal conditions includes:<br>• emergency, including emergency shut down<br>• partial or complete controller failure |
| Other problems | Other problems includes:<br>• problem solving control functions |

| **Evidence Guide** | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• recognized early warning signs of equipment/processes needing attention or with potential problems<br>• identified and analyzed the range of possible causes and determined the most likely cause<br>• took appropriate action to ensure a timely return to full performance<br>• recognized obvious problems in related plant areas and made an appropriate contribution to their solution |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• the architecture and location of the process/production equipment<br>• specific plant process operations<br>• interactions between plant items/processes<br>• product specifications and tolerances<br>• systems operating parameters<br>• system integrity limits<br>• process control philosophies and strategies<br>• emergency shutdown procedures<br>• process specific physics, chemistry and mathematics<br>• basic science of upstream and downstream processes<br>• relevant chemistry of the process to the level of interpreting chemical equations and manipulating factors controlling rate of reaction and yield (or equivalent physics for a physical process chemistry to include both intended products and interfering reactions, e g salts, hydrates |

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| | • impact of external factors, e g variations in weather, feed etc<br>• process drawings, e g P&ID, PFD<br>• cause and effect<br>• basis of control for the plant/s<br>• instrumentation and control systems, including feed forward, feed back and open control<br>• instrumentation and control system components, e g relevant primary sensing devices, final control elements, transducers /transmitters<br>• control loops, including PID control, set points, controlled variable, indicated variable<br>• interaction between multiple control loops, including cascade control<br>• impacts of changing controller settings and the limits within which changes can be made<br>• effective communication techniques<br>• organization procedures<br>• UPS and its applications and use |
| Underpinning Skills | Demonstrates skills to:<br>• instrument failure/malfunction<br>• electrical failure/malfunction<br>• mechanical failure/malfunction<br>• equipment design deficiencies<br>• product parameters (temperature, flows, pressure and levels)<br>• process control system malfunction<br>• power/utility failures |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:<br>• Written Test<br>• Observation / Demonstration |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
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| | **Process Raw Material into Cement** |
| **Unit Code** | **IND CPT3 03 0111** |
| **Unit Descriptor** | This unit of competence covers the preparation and processing (in a large plant) of raw material through a kiln and distribution of the cement product to storage. It involves conducting pre-start checks, operating and monitoring the process, rectifying operational problems and facilitating output changes. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for processing | 1.1 Notify/keep informed all relevant people about the current status operations and any intention to make changes<br>1.2 Perform all pre-start checks in accordance with standard operating ***procedures***<br>1.3 Set up and configure ***equipment*** startup function complying with procedures<br>1.4 Check plant/equipment settings against operating parameters as identified in standard operating procedures<br>1.5 Load raw materials in accordance with work instructions<br>1.6 Start up plant/equipment in accordance with procedures |
| 2. Process raw material | 2.1 Commence/continue process operations in accordance with specified operating procedures<br>2.2 Monitor and check against target parameters instrument/ control panels for variations, fluctuations or trends<br>2.3 Maximize throughput of system while meeting quality target parameters<br>2.4 Check and adjust ancillary equipment as required |
| 3. Distribute Cement to Storage/Customers | 3.1 Monitor and perform necessary adjustments to discharge rate and temperature as required<br>3.2 Monitor the distribution transport system for efficiency and spillages and take appropriate action as required<br>3.3 Monitor the distribution of cement to the correct storage area and level of product in that area, and redirect as required |

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| 4. Respond to problems | 4.1 Identify possible routine and non-routine ***problems*** in the equipment or process<br>4.2 Determine problems needing action<br>4.3 Determine possible fault causes<br>4.4 Rectify problem using appropriate solution within area of responsibility<br>4.5 Follow through items initiated until final resolution has occurred<br>4.6 Report problems outside area of responsibility to designated person |
| 5. Shut down equipment | 5.1 Ensure line is clear of all product and left ready for startup<br>5.2 Shut down equipment in accordance with procedures<br>5.3 Complete appropriate records and logs<br>5.4 Shut down equipment in an emergency situation |
| 6. Prepare equipment for maintenance | 6.1 Isolate equipment in accordance with procedures<br>6.2 Remove any broken materials safely<br>6.3 Ensure area is clear and safe for maintenance |
| 7. Control hazards | 7.1 Identify hazards in kiln work area<br>7.2 Assess the risks arising from those hazards<br>7.3 Implement measures to control those risks in line with procedures and duty of care |

| **Variable** | **Range** |
|---|---|
| Procedures | All operations are performed in accordance with standard procedures and work instructions |
| Equipment | Equipment and operations may include:<br>• instrument panels (local)<br>• measuring and recording equipment<br>• communication equipment<br>• hand tools<br>• emergency stop buttons and lanyards<br>• personal protective equipment<br>• grinding mills<br>• pneumatic conveying systems<br>• slurry pumps<br>• dust collectors<br>• mixing and blending silos<br>• vibrating screens<br>• kilns<br>• bulk storage silos |

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| | • heat recovery systems |
| problems | Typical problems may include:<br>• equipment malfunctions<br>• temperature fluctuations<br>• quality of product<br>• material/feed variations<br>• spillages and leakages<br>• inaccuracies in blending and proportioning of raw materials<br>• out of specification moisture content of raw materials<br>• variations in temperature, time and cooling rates<br>• variations in feed rates or quantities<br>• vibration |
| Occupational health and safety (OHS) | The identification and control of hazards and the application of OHS are to be in accordance with current, applicable legislation and regulations, and company procedures. All work is carried out at all times in accordance with these requirements |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• maintained temperatures within limits<br>• monitored quality to minimize wastage<br>• made or observed process measurements continually |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• operation procedures of the kiln and kiln system<br>• kiln chemistry, chemistry and physics of cement making processes (as appropriate)<br>• isolation procedures<br>• operational processes and functions, including startup and shutdown processes<br>• composition and nature of raw materials and finished product<br>• construction and limitations of the equipment<br>• out of specification situations<br>• material feed, cooling and distribution systems<br>• distinguish between causes of faults such as:<br>➢ equipment fault<br>➢ variations in raw materials<br>➢ variations in feed rates and preparation<br>➢ kiln quality and optimization practices<br>➢ types of kiln fuels and reactions<br>➢ acceptable ranges of variations |
| Underpinning Skills | Demonstrates skills to:<br>• recognizing variance from specifications and standard operating procedures and determining an appropriate |

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| | action that is consistent with operating guidelines<br>• implementing the enterprise's standard procedures and work instructions and relevant regulatory requirements within appropriate time constraints and in a manner relevant to the operation of the process<br>• reading and numeracy to interpret workplace documents and technical information |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Written Test<br>• Observation / Demonstration |
| Context of Assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Provide Coaching/Mentoring in the Workplace** |
| **Unit Code** | **IND CPT3 04 0111** |
| **Unit Descriptor** | This competence covers the skills and knowledge required to act as a mentor/coach to other individuals in the workplace. Coaching and mentoring are undertaken within the coach/mentor's area of expertise on a one on one basis. |

| **Elements** | **Performance Criteria** |
|---|---|
| 1. Establish coaching/mentoring relationship. | 1.1 Identify areas for development in line with organizational and individual's requirements.<br>1.2 Use effective communication styles to develop trust, confidence and rapport.<br>1.3 Make agreements on how the relationship will be conducted<br>1.4 1.4 Discuss and clarify expectations and goals |
| 2. Provide coaching/mentoring support. | 2.1 Assist the individual to identify and evaluate opportunities to achieve agreed goals/development activities.<br>2.2 Share personal experiences and knowledge with the individual to assist in progress to agreed goals/development.<br>2.3 Provide a supportive environment to allow the individual to develop towards the achievement of goals.<br>2.4 Encourage the individual to make decisions and take responsibility for the courses of actions or solutions under consideration.<br>2.5 2.5 Provide assistance and guidance in a manner which allows the individual to retain responsibility for achievement in their goals. |
| 3. Evaluate effectiveness of coaching/mentoring. | 3.1 Recognise and openly discuss changes in the coaching /mentoring relationship.<br>3.2 Make adjustments to the relationship to take account of the needs of both the mentor/coach and the individual.<br>3.3 3.3 Seek feedback from individual and other relevant personnel to identify and implement improvements |

| Variable | Range |
|---|---|
| Context | • This competence applies to all work environments in the process manufacturing industries |
| Procedures | • All operations are performed in accordance with procedures.<br>• Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. |
| Tools and equipment | This competence includes use of equipment and tools such as:<br>• relevant process equipment, components and auxiliary equipment<br>• PPE. |
| Hazards | Typical workplace hazards include:<br>• chemicals and hazardous materials<br>• gases and liquids under pressure<br>• moving machinery<br>• materials handling<br>• working at heights, in confined spaces, or in environments subjected to heat, noise, dusts or vapors |
| Problems | Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.<br>Typical problems may include:<br>• lack of materials and resources<br>• conflicting work priorities<br>• time constraints<br>• lack of cooperation<br>• lack of willingness to receive feedback<br>• Appropriate action for non-routine problems may include<br>• reporting to designated person or other action specified in the procedures |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• understood the role and benefits of mentoring/coaching in the business<br>• used of significant workplace knowledge and experience to assist another individual to achieve their goals/development needs<br>• applied effective communication styles<br>• created effective learning environment that allows for open discussion, feedback, tolerance of mistakes during learning, within a safe environment, and affirmation of the individual's worthiness |

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| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• work effectively with individuals who have diverse work styles, aspirations, cultures and perspectives<br>• using effective methods of coaching/mentoring<br>• applying organization policies, procedures and plans<br>• applying methods and techniques for eliciting and interpreting feedback<br>• explaining relevant career paths and competence standards in the organization<br>• applying methods for identifying development opportunities<br>• using effective planning skills to organize activities<br>• giving, receiving and analyzing feedback effectively |
| Underpinning Skills | Demonstrates skills to:<br>• read and interpret organization requirements which may be included in:<br>➢ quality assurances and/or procedures manuals<br>➢ goals, objectives, plants, systems and processes<br>➢ legal and organizational policy/guidelines and requirements<br>➢ OHS policies, procedures and programs<br>➢ confidentiality and security requirements<br>➢ business and performance plans<br>➢ anti-discrimination and related policy<br>➢ access and equity principles and practice<br>➢ ethical standards<br>➢ quality and continuous improvement processes and standards<br>• writing is required to the level of completing records and reports<br>• numeracy is required to the extent required by work instructions and procedures |
| Resource Implications | The following resources should be provided:<br>• access to relevant workplace or appropriately simulated environment where assessment can take place<br>• materials relevant to the proposed activity or task |
| Methods of Assessment | Competence may be assessed through:<br>• Written Test<br>• Observation/demonstration |
| Context of Assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

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| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Use Structured Problem Solving Tools** |
| **Unit Code** | **IND CPT3 05 0111** |
| **Unit Descriptor** | This competence covers the solving of process and other problems, beyond those associated directly with the process unit/equipment, using structured process improvement tools to identify improvements and/or solve problems |

| Elements | Performance Criteria |
|---|---|
| 1. Identify the problem | 1.1 Identify variances from normal operating parameters and product quality.<br>1.2 Define the extent, cause and nature of the problem by observation and investigation.<br>1.3 State and specify the problem clearly. |
| 2. Determine fundamental cause of problem. | 2.1 Identify possible causes based on experience and the use of problem solving tools/analytical techniques.<br>2.2 Develop possible cause statements.<br>2.3 Identify fundamental cause. |
| 3. Determine corrective action. | 3.1 Consider all possible options for resolution of the problem.<br>3.2 Consider strengths and weaknesses of possible options.<br>3.3 Determine corrective action to remove the problem and possible future causes.<br>3.4 Develop implementation plans identifying measurable objectives, resource needs and timelines in accordance with safety and operating ***procedures***.<br>3.5 Develop recommendations for ongoing monitoring and Testing |
| 4. Communicate recommendations | 4.1 Prepare report on recommendations.<br>4.2 Present recommendations to appropriate personnel.<br>4.3 Follow up recommendations if required |

| Variable | Range |
|---|---|
| Context | • The competence unit applies to a wide range of processes and equipment. The process manufacturing technical units of competence include a problem solving element where problems specific to that competence unit are to be resolved.<br>• This competence unit is where structured problem solving |

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| | techniques are to be applied more broadly, or with greater depth/rigour than is implied by the problem solving element of the technical units.<br>• In large plants or manufacturing organizations with multiple processes, it may apply to more than one process if those processes interact with each other. It applies to all operators across all functions |
| Procedures | • All operations are performed in accordance with procedures.<br>• Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards |
| Hazards | • Typical hazards include leaks, spillages and equipment hazards that can occur during the walk-through of a plant. |
| Problems | • Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures. Typical process and product problems may include:<br>• non- routine process and quality problems<br>• equipment selection, availability and failure<br>• teamwork and work allocation problems<br>• safety and emergency situations and incidents |

| **Evidence Guide** | |
|---|---|
| Critical aspects of competence | Assessment requires evidence that the candidate:<br>• relevant equipment and operational processes<br>• enterprise policies and procedures<br>• enterprise goals, targets and measures<br>• enterprise quality, OHS and environmental requirements<br>• principles of decision-making strategies and techniques<br>• enterprise information systems and data collation<br>• industry codes and standards<br>• recognized and clarified problems<br>• identified possible causes, based on experience and use of analytical techniques in solving the problem, including:<br>➢ identified variations<br>➢ identified cause and effect<br>➢ separated single problems from multiple problems<br>➢ recognized recurring problems<br>➢ determined fundamental cause of process or equipment faults<br>➢ developed corrective/preventative implementation plans to avoid recurrence of the problem<br>➢ presented implementation plan to relevant personnel |
| Underpinning knowledge | Demonstrates knowledge of:<br>• brainstorming |

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| | • fishbone diagrams/cause and effect diagrams<br>• process logic/process requirements<br>• logic tree<br>• similarity/difference analysis<br>• Pareto analysis<br>• force field/SWOT analysis<br>• flow charts<br>• control charts, runcharts and graphs<br>• scattergrams<br>• priority requirements<br>• measurable objectives<br>• resource requirements<br>• methods for reaching objectives<br>• timelines<br>• coordination and feedback requirements<br>• safety requirements<br>• risk assessment<br>• environmental requirements |
| Underpinning skills | Demonstrates skills to:<br>• read and interpret typical product specifications, job sheets and material labels as provided to operators<br>• Writing is required to the level of report writing and completing workplace forms<br>• Basic numeracy is also required, e g to interpret quality data and graphs |
| Resource implications | The following resources should be provided:<br>• access to relevant workplace or appropriately simulated environment where assessment can take place<br>• materials relevant to the proposed activity or task |
| Methods of assessment | Competence may be assessed through:<br>• Interview<br>• Observation/demonstration |
| Context for assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Undertake Root Cause Analysis** |
| **Unit Code** | **IND CPT2 06 0111** |
| **Unit Descriptor** | This unit covers the knowledge and skills needed to undertake root cause analysis (RCA) by any person contributing to increasing the uptime and general overall equipment efficiency. This will often be done by people working in a team. This unit also covers the competencies needed by operators to contribute to an advanced maintenance strategy using RCA coupled with diagrams and charts. |

| Elements | Performance Criteria |
|---|---|
| 1. Recognize problems | 1.1 Identify equipment/plant characteristics indicative of a problem.<br>1.2 Identify process conditions/product characteristics indicative of a problem.<br>1.3 Use ***appropriate techniques/charts*** to define the problem. |
| 2. Implement quick fix | 2.1 Recommend/implement a quick fix within the scope of competence and authority<br>2.2 Use technology or processes relevant to the problem to implement quick fix |
| 3. Determine *root cause* | 3.1 Identify a range of possible causes<br>3.2 Gather information to eliminate/confirm causes<br>3.3 Construct a cause and effect diagram from available data<br>3.4 Seek assistance as required<br>3.5 Identify ***root cause*** |
| 4. Develop permanent solution | 4.1 Identify a range of methods of eliminating the root cause/breaking the ***cause tree***<br>4.2 Select the most appropriate solution<br>4.3 Liaise with relevant people<br>4.4 Recommend or implement solution within the limits of competence and authority.<br>4.5 Monitor impact of solution and make further recommendations as required. |

| Variable | Range |
|---|---|
| Root cause | • There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem.<br>• However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem. |
| Cause tree | • The series of causes is referred to as the cause tree. Not all root causes are accessible and able to be eliminated. Breaking the cause tree is such a way that the problem cannot recur is an acceptable alternative.<br>• Not all situations can wait for the root cause analysis and eventual elimination of the root cause as there are serious current impacts. The quick fix will control these immediate impacts, but does not eliminate the root cause. |
| Uptime | • Uptime refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100% |
| Appropriate techniques/charts | Appropriate techniques/charts may include the following:<br>• control charts<br>• Pareto charts<br>• run charts<br>• flow charts<br>• cause and effect diagrams<br>• tree diagrams<br>• 4W analysis |
| Overall Equipment Efficiency (OEE) | Overall Equipment Efficiency (OEE) is the combination of the main factors causing loss of productive capacity from equipment/plant and is:<br>*OEE = availability x performance x quality rate*<br>where:<br>• availability takes into account losses due to breakdown, set up and adjustments<br>• performance takes into account losses due to minor stoppages, reduced speed and idling<br>• quality rate takes into account losses due to rejects, re-works and start up waste |

| Evidence Guide | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Performed root cause analyses. |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• root cause analysis methodology<br>• indicators of a problem<br>• principles of the process sufficient to undertake a RCA and propose solutions<br>• use of relevant analysis tools (e.g. cause/effect diagrams, Pareto charts, 4W) |
| Underpinning Skills | Demonstrates skills to:<br>• analysis<br>• problem solving<br>• communication<br>• documenting |
| Resource Implications | The following resources should be provided:<br>• Access to relevant workplace or appropriately simulated environment where assessment can take place<br>• Materials relevant to the proposed activity or task |
| Methods Of Assessment | Competence may be assessed through:<br>• Interview / Written Test / Oral Questioning<br>• Observation/demonstration |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Conduct Local Risk Assessment** |
| **Unit Code** | **IND CPT2 07 0111** |
| **Unit Descriptor** | This unit covers the skills and knowledge required to apply basic risk control processes at a mine site. It includes the identification of hazards; assessing risk; identifying unacceptable risk; identifying/analyzing and implementing risk treatment; and completing records and reports |

| Elements | Performance Criteria |
|---|---|
| 1. Identify hazards | 1.1 Analyze work area conditions to identify/recognize potential ***hazards*** in the workplace<br>1.2 Access and analyze relevant safety systems information to eliminate situations covered by existing and adequate procedures.<br>1.3 Recognize the type and scope of unresolved hazards and their likely impact. |
| 2. Assess risk and identify unacceptable risk | 2.1 Evaluate and determine ***consequence*** if the event should occur.<br>2.2 Consider and determine ***likelihood*** of the event.<br>2.3 Identify criteria for the acceptability/ unacceptability of the risk or source from the appropriate party<br>2.4 Evaluate risk against criteria to identify if it warrants '*unacceptable risk*' status and either action or refer to the appropriate party. |
| 3. Identify, analyze and implement risk treatments | 3.1 Identify and consider all possible risk treatment options<br>3.2 Identify feasible options by preliminary analysis and consideration of possible options<br>3.3 Analyze feasible options, including the identification of resource requirements<br>3.4 Select most appropriate action for dealing with the situation.<br>3.5 Plan and prepare the course of action in detail and acquire/obtain required resources.<br>3.6 Implement the course of action |
| 4. Complete records and reports | 4.1 Communicate information on the course of action and implementation to the relevant people.<br>4.2 Complete records and reports for hazards and actions from personal risk assessment as specified by legislative |

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| | and site requirements. |
| **Variable** | **Range** |
| Risk | Risk is defined as: the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood. (national *Risk Management—put reference*) |
| Hazard | Hazard is defined as: a source of potential harm or a situation with a potential to cause loss. Hazards may include:<br>• equipment<br>• methods/plans<br>• people<br>• the work environment(national *Risk Management—put reference*) |
| Risk treatment | Risk treatment is defined as:<br>• Selection and implementation of appropriate options for *dealing with risk.* (national *Risk Management—put reference*) |
| Records and reports | • hazard reporting forms<br>• supervisor/deputy's/OCE reports<br>• incident reports<br>• near-miss reports<br>• shift reports |
| Consequence | Consequence is defined as:<br>• The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event (national *Risk Management—put reference*) |
| Frequency | Frequency is defined as:<br>• A measure of the rate of occurrence of an event expressed as the number of occurrences of an event in a given time.<br>(national *Risk Management—put reference*) |
| Likelihood | Likelihood is used as:<br>• A qualitative description of probability and frequency.<br>(national *Risk Management—put reference*) |
| Probability | Probability is defined as:<br>• The likelihood of a specific outcome, measured by the ratio of specific events or outcomes to the total number of possible events or outcomes. Probability is expressed as a number between 0 and 1, with 0 indicating an impossible event or outcome and 1 indicating an event or outcome is certain.<br>(national *Risk Management—put reference*)<br>• Criteria for the acceptability/unacceptability of the risk must be determined by the organization's internal policy, goals and/ or objectives in reference to relevant legislation. |

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| Risk treatment | Risk treatment options may include:<br>• eliminating the hazard<br>• substitution<br>• engineering controls<br>• Administrative controls (procedures, etc.)<br>• personal protective equipment |

| **Evidence Guide** | |
|---|---|
| Critical aspects of competence | Assessment requires evidence that the candidate:<br>• Understood procedures, requirements and instructions to conduct local risk assessment appropriate to a mine site.<br>• implemented appropriate procedures and techniques for the efficient and effective conduct local risk assessment appropriate to a mine site, while complying with site safety, environmental, quality and communication requirements<br>• identified hazards, assessed risk and identified unacceptable risk, identified, analyzed and implemented risk treatments completing records and reports |
| Underpinning knowledge | Demonstrates knowledge of:<br>risk management processes and methods, including:<br>• identifying hazards, assessing risks, determining acceptability of risks, identifying controls<br>• mine site risk management procedures<br>• mine site safety systems information<br>• mine site communication, reporting and recording procedures |
| Underpinning skills | Demonstrates skills to:<br>• proactively identify hazards<br>• take action in response to risks |
| Resource implications | The following resources should be provided:<br>• access to relevant workplace or appropriately simulated environment where assessment can take place<br>• materials relevant to the proposed activity or task |
| Methods of assessment | Competence may be assessed through:<br>• Interview / Written Test / Oral Questioning<br>• Observation/demonstration |
| Context for assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Interpret Technical Drawing** |
| **Unit Code** | **IND CPT3 08 0111** |
| **Unit Descriptor** | This unit covers interpreting technical drawing applying to any of the full range of engineering disciplines |

| **Elements** | **Performance Criteria** |
|---|---|
| 1. Select correct technical drawing | 1.1 Drawing is checked and validated against job requirements or equipment.<br>1.2 Drawing version is checked and validated. |
| 2. Interpret technical drawing | 2.1 Components, assemblies or objects are recognized as required<br>2.2 Dimensions are identified as appropriate to field of employment.<br>2.3 Instructions are identified and followed as required.<br>2.4 Material requirements are identified as required.<br>2.5 Symbols are recognized in the drawing as appropriate |

| **Variable** | **Range** |
|---|---|
| Interpret technical drawing | AS1100.101 is an extensive work and the candidate is not required to have complete familiarity with all its contents, the application of AS1100 would usually be in line with standard operating procedures; interpretation may require guidance particularly in respect to any geometric tolerancing |

| **Evidence Guide** | |
|---|---|
| Critical aspects of competence | Demonstrates skills and knowledge in:<br>• Selecting correct technical drawing<br>• Interpreting technical drawing |
| Underpinning knowledge | Demonstrates knowledge of:<br>• relationship between the views contained in the drawing<br>• objects represented in the drawing<br>• units of measurement used in the preparation of the drawing<br>• dimensions of the key features of the objects depicted in the drawing<br>• understanding of the instructions contained in the drawing |

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| | • the actions to be undertaken in response to those instructions<br>• the materials from which the object(s) are made<br>• any symbols used in the drawing as described in range statement<br>• hazard and control measures associated with interpreting technical drawings, including housekeeping<br>• safe work practices and procedures |
| Underpinning skills | Demonstrates skills to:<br>• checking the drawing against job requirements/related equipment in accordance with standard operating procedures<br>• confirming the drawing version as being current in accordance with standard operating procedures<br>• where appropriate, obtaining the current version of the drawing in accordance with standard operating procedures<br>• reading, interpreting information on the drawing, written job instructions, specifications, standard operating procedures, charts, lists and other applicable reference documents<br>• checking and clarifying task related information<br>• undertaking numerical operations, geometry and calculations /formulae within the scope of this unit |
| Resource implications | The following resources should be provided:<br>• access to relevant workplace or appropriately simulated environment where assessment can take place<br>• materials relevant to the proposed activity or task |
| Methods of assessment | Competence may be assessed through:<br>• Written Test<br>• Observation/demonstration |
| Context for assessment | Competence may be assessed in the work place or in a simulated work place setting. |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Monitor Implementation of Work plan/Activities** |
| **Unit Code** | **IND CPT3 09 0111** |
| **Unit Descriptor** | This unit covers the knowledge, attitudes and skills required to oversee and monitor the quality of work operations within an enterprise. |

| Element | Performance Criteria |
|---|---|
| 1 Monitor and improve workplace operations | 1.1 Efficiency and service levels are monitored on an ongoing basis.<br>1.2 Operations in the workplace support overall enterprise goals and quality assurance initiatives.<br>1.3 Quality ***problems*** and issues are promptly identified and adjustments are made accordingly.<br>1.4 Procedures and systems are changed in consultation with colleagues to improve efficiency and effectiveness.<br>1.5 Colleagues are consulted about ways to improve efficiency and service levels. |
| 2 Plan and organise workflow | 2.1 Current workload of colleagues is accurately assessed.<br>2.2 Work is scheduled in a manner which enhances efficiency and customer service quality.<br>2.3 Work is delegated to appropriate people in accordance with principles of delegation.<br>2.4 Workflow is assessed against agreed objectives and timelines.<br>2.5 Colleagues are assisted in prioritisation of workload.<br>2.6 Input is provided to appropriate management regarding staffing needs. |
| 3 Maintain workplace records | 3.1 ***Workplace records*** are accurately completed and submitted within required timeframes.<br>3.2 Where appropriate completion of records is delegated and monitored prior to submission. |
| 4 Solve problems and make decisions | 4.1 Workplace problems are promptly identified and considered from an operational and customer service perspective.<br>4.2 Short term action in initiated to resolve the immediate problem where appropriate. |

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| | 4.3 Problems are analysed for any long term impact and potential solutions are assessed and actioned in consultation with relevant colleagues.<br>4.4 Where problem is raised by a team member, they are encouraged to participate in solving the problem.<br>4.5 Follow up action is taken to monitor the effectiveness of solutions in the workplace |

| **Variable** | **Range** |
|---|---|
| Problems | May include but not limited to:<br>• difficult customer service situations<br>• equipment breakdown/technical failure<br>• delays and time difficulties |
| Workplace records | may include but is not limited to:<br>• staff records<br>• regular performance reports |

| **Evidence Guide** | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• monitored and responded effectively to a range of common operational and service issues in the workplace<br>• understood the role of staff involved in workplace monitoring<br>• know quality assurance, principles of workflow planning, delegation and problem solving |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:<br>• the roles and responsibilities of those involved in monitoring work operations<br>• overview of leadership and management responsibilities<br>• principles of work planning<br>• typical work organization methods appropriate to the industry sector<br>• quality assurance principles<br>• time management<br>• principles of delegation<br>• problem solving and decision making processes<br>• industrial and/or legislative issues which affect short term work organization as appropriate to industry sector |
| Underpinning Skills | Demonstrate skills to:<br>• monitoring and improving workplace operations<br>• planning and organizing workflow<br>• maintaining workplace records |
| Resource Implications | The following resources should be provided:<br>Access is required to real or appropriately simulated situations, |

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| | including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Written test<br>• Observation / Demonstration |
| Context for Assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Apply Quality Control** |
| **Unit Code** | **IND CPT3 10 0111** |
| **Unit Descriptor** | This unit covers the knowledge, attitudes and skills required in applying quality control in cement production process. |

| Elements | Performance Criteria |
|---|---|
| 1. Establish quality standards | 1.1 Quality standard procedures in cement production process are developed and agreed upon.<br>1.2 Quality standard procedures are documented in accordance with the organization policy<br>1.3 Standard procedures are introduced to organizational staff / personnel<br>1.4 Standard procedures are revised / updated when necessary |
| 2. Assess quality of service delivered | 2.1 Services delivered are ***checked*** against organization ***quality standards*** and specifications<br>2.2 Service delivered are evaluated using the appropriate evaluation ***parameters*** and in accordance with organization standards<br>2.3 Causes of any identified faults are identified and corrective actions are taken in accordance with organization policies and procedures |
| 3. Record information | 3.1 Basic information on the quality performance is recorded in accordance with organization procedures<br>3.2 Records of work quality are maintained according to the requirements of the organization |
| 4. Study causes of quality deviations | 4.1 Causes of deviations from final outputs or services are investigated and reported in accordance with organization procedures<br>4.2 Suitable preventive action is recommended based on organization ***quality standards*** and identified causes of deviation from specified quality standards of final service or output |
| 5. Complete documentation | 5.1 Information on quality and other indicators of service performance is recorded<br>5.2 All service processes and outcomes are recorded |

| Variable | Range |
|---|---|
| Quality check | • Check against design<br>• Visual inspection<br>• Physical inspection |
| Quality standards | May include but not limited to<br>• materials<br>• products<br>• maintenance process |
| Quality parameters | • standard design<br>• material specification<br>• chemical composition<br>• strength<br>• size<br>• moisture content |

| Evidence Guide | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Checked completed work continuously against organization standard<br>• Identified and isolated faulty or poor service<br>• Checked service delivered against organization standards<br>• Identified and applied corrective actions on the causes of identified faults or error<br>• Recorded basic information regarding quality performance<br>• Investigated causes of deviations of services against standard<br>• Recommended suitable preventive actions |
| Underpinning Knowledge | Demonstrates knowledge of:<br>• Relevant quality standards, policies and procedures<br>• Characteristics of services<br>• Safety environment aspects of service processes<br>• Relevant evaluation techniques and quality checking procedures<br>• Workplace procedures and reporting procedures |
| Underpinning Skills | Demonstrates skills to:<br>• Interpret work instructions, specifications and standards appropriate to the required work or service<br>• Carry out relevant performance evaluation<br>• Maintain accurate work records in accordance with procedures<br>• Meet work specifications and requirements<br>• Communicate effectively within defined workplace procedures |

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| Resource Implications | The following resources should be provided:<br>• Access to relevant workplace or appropriately simulated environment and materials relevant to the activity/ task |
| Methods of Assessment | Competence may be accessed through:<br>• Interview / Written test<br>• Observation / Demonstration |
| Context for Assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Lead Workplace Communication** |
| **Unit Code** | **IND CPT3 11 0111** |
| **Unit Descriptor** | This unit covers the skills required to exercise effective communication skills among staff and stake holders to support the delivery of staff and stakeholders services within the cement industry |

| Elements | Performance Criteria |
|---|---|
| 1. Identify relationship with in the organization internally and externally | 1.1 Develop, review and revise personal skills in communication as an ongoing priority to address organization standards<br>1.2 Exercise caution in communicating personal information by oral and written means to ensure confidentiality of staff and stakeholders and staff matters<br>1.3 Routinely apply workplace protocols and procedures in all workplace communication to support accuracy and understanding of information provided and received<br>1.4 Recognize individual and cultural differences and make any adjustments needed to facilitate the achievement of identified outcomes<br>1.5 Conduct interpersonal communication with team and client in a manner that enhances a staff and stakeholders centre within organization standards<br>1.6 Take appropriate measures to resolve conflict and interpersonal differences in the workplace |
| 2. Exercise effective communication techniques within work environment and follow routine instructions | 2.1 ***Special needs*** of staff and stakeholders are identified and responded<br>2.2 All ***communication*** with staff and stakeholders are ensured to reflect an understanding and respect for ***individual differences*** and needs<br>2.3 Ensure communication is clear and relevant to situation, context and activities undertaken<br>2.4 Seek advice about ***communication*** difficulties with staff and stakeholders or client from supervisor or other ***appropriate person*** and implement as required<br>2.5 Adjust own style to incorporate advice that addresses performance issues to maintain the agreed standard of effective ***communication***<br>2.6 Ensure work place instructions are interpreted correctly |

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| | and carried out within agreed timeframes<br>2.7 Seek clarification of work instructions, ***tools and equipment*** when required to ensure understanding<br>2.8 Refer any difficulties in carrying out instructions to supervisor or appropriate person to ensure required work outcomes |
| 3. Identify and provide effective response to staff and stakeholders enquiries | 3.1 Evaluate practice to maintain a high standard of staff and stakeholders service<br>3.2 Identify and acknowledge enquirer's expectations<br>3.3 Discuss any unresolved concerns or issues with enquirers<br>3.4 Give feedback for staff and stakeholders according to workplace guidelines and ethics |

| **Variable** | **Range** |
|---|---|
| Communication | May include but not limited to<br>• Appropriate language<br>• communication aids<br>• modes of communication<br>• questioning<br>• clarifying<br>• advising, providing appropriate and accurate information<br>• honesty and integrity |
| Special needs | May include but not limited to<br>• Disability<br>• Communication difficulties<br>• Language difficulties |
| Tools and equipment | May include but not limited to:<br>• Telephone<br>• Fax<br>• Computer |
| Individual differences : | May include but not limited to:<br>• Developmental<br>• Cultural<br>• Physical<br>• Emotional<br>• Behavioral<br>• Intellectual |

| Evidence Guide | |
|---|---|
| Critical Aspects of Competence | Demonstrates skills and knowledge in:<br>• Demonstrate compliance with accepted Drafting Standard<br>• Apply conventional graphic quality<br>• Demonstrate precision in dimensioning and accuracy in description<br>• Demonstrate consistent style of presentation<br>• Demonstrate ability in systematic filing and cataloguing<br>• Demonstrate efficient use of space<br>• Easy access to technical documents in soft copy or hard copy<br>• specified essential knowledge as well as skills as specified in elements and performance criteria of the unit of competence |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Principles of computer aided drafting (Auto CAD, Terra model, Eagle point)<br>• Techniques and sequence of design & drawing process<br>• Principles of drafting standards<br>• Techniques of technical report writing<br>• Techniques of filing system<br>• Procedures of submittal requirements<br>• Basic management<br>• Effective communication strategies<br>• Principles and practices of services provided<br>• Organization policies, procedures and guidelines<br>• Legal and ethical issues relating to practitioner — staff and stakeholders relations |
| Underpinning Skills | Demonstrates skills to:<br>• Apply computer aided drafting<br>• Verify technical data and documents<br>• managing<br>• Check technical documents |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written test<br>• Observation / Demonstration |
| Context of Assessment | Competence may be assessed in the workplace or in a simulated workplace setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Lead Small Teams** |
| **Unit Code** | **IND CPT3 12 0111** |
| **Unit Descriptor** | This unit covers the skills, knowledge and attitudes required to determine individual and team development needs and facilitate the development of the work group. |

| Elements | Performance Criteria |
|---|---|
| 1. Provide team leadership | *1.1* ***Learning and development needs*** are systematically identified and implemented in line with ***organizational requirements***<br>1.2 Learning plan to meet individual and group training and developmental needs is collaboratively developed and implemented<br>1.3 Individuals are encouraged to self evaluate performance and identify areas for improvement<br>1.4 Feedback on performance of team members is collected from relevant sources and compared with established team learning process |
| 2. Foster individual and organizational growth | 2.1 Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of competence standards<br>2.2 Learning delivery methods are appropriate to the learning goals, the learning style of participants and availability of equipment and resources<br>2.3 Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies<br>2.4 Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements |

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| 3. Monitor and evaluate workplace learning | 3.1 Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements<br>3.2 Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support<br>3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning<br>3.4 Records and reports of competence are maintained within organizational requirement |
| 4. Develop team commitment and cooperation | 4.1 Open communication processes to obtain and share information is used by team<br>4.2 Decisions are reached by the team in accordance with its agreed roles and responsibilities<br>4.3 Mutual concern and camaraderie are developed in the team |
| 5. Facilitate accomplishment of organizational goals | 5.1 Team members actively participated in team activities and communication processes<br>5.2 Teams members developed individual and joint responsibility for their actions<br>5.3 Collaborative efforts are sustained to attain organizational goals |

| **Variable** | **Range** |
|---|---|
| Learning and development needs | • Coaching, mentoring and/or supervision<br>• Formal/informal learning program<br>• Internal/external training provision<br>• Work experience/exchange/opportunities<br>• Personal study<br>• Career planning/development<br>• Performance appraisals<br>• Workplace skills assessment<br>• Recognition of prior learning |
| Organizational requirements | • Quality assurance and/or procedures manuals<br>• Goals, objectives, plans, systems and processes<br>• Legal and organizational policy/guidelines and requirements<br>• Safety policies, procedures and programs<br>• Confidentiality and security requirements<br>• Business and performance plans<br>• Ethical standards<br>• Quality and continuous improvement processes and standards |

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| Feedback on performance | • Formal/informal performance appraisals<br>• Obtaining feedback from supervisors and colleagues<br>• Obtaining feedback from clients<br>• Personal and reflective behavior strategies<br>• Routine and organizational methods for monitoring service delivery |
| Learning delivery methods | • On the job coaching or mentoring<br>• Problem solving<br>• Presentation/demonstration<br>• Formal course participation<br>• Work experience<br>• Involvement in professional networks<br>• Conference and seminar attendance<br>• Induction |

| **Evidence Guide** | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Identified and implemented learning opportunities for others<br>• Gave and received feedback constructively<br>• Facilitated participation of individuals in the work of the team<br>• Negotiated learning plans to improve the effectiveness of learning<br>• Prepared learning plans to match skill needs<br>• Accessed and designated learning opportunities |
| Underpinning Knowledge and Attitude | Demonstrates knowledge of:<br>• Coaching and mentoring principles<br>• Understanding how to work effectively with team members who have diverse work styles, aspirations, cultures and perspective<br>• Understanding how to facilitate team development and improvement<br>• Understanding methods and techniques for eliciting and interpreting feedback<br>• Understanding methods for identifying and prioritizing personal development opportunities and options<br>• Knowledge of career paths and competence standards in the industry |
| Underpinning Skills | Demonstrates skills to:<br>• Ability to read and understand a variety of texts, prepare general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management<br>• Communication skills including receiving feedback and |

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| | reporting, maintaining effective relationships and conflict management<br>• Planning skills to organize required resources and equipment to meet learning needs<br>• Coaching and mentoring skills to provide support to colleagues<br>• Reporting skills to organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes<br>• Facilitation skills to conduct small group training sessions<br>• Ability to relate to people from a range of social, cultural, physical and mental backgrounds |
| Resource Implications | Access to relevant workplace or appropriately simulated environment where assessment can take place |
| Assessment Methods | Competence may be assessed through:<br>• Interview / Written exam<br>• Observation / Demonstration |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

TOP

| Occupational Standard: Cement Production Technical Operation Level III | |
|---|---|
| **Unit Title** | **Improve Business Practice** |
| **Unit Code** | **IND CPT3 13 0111** |
| **Unit Descriptor** | This unit covers the skills, knowledge and attitudes required in promoting, improving and growing business operations. |

| Elements | Performance Criteria |
|---|---|
| 1. Diagnose the business | 1.1 ***Data required*** for diagnosis is determined and acquired<br>1.2 ***Competitive advantage*** of the business is determined from the data<br>1.3 ***SWOT analysis*** of the data is undertaken |
| 2. Benchmark the business | 2.1 Sources of relevant benchmarking data are identified<br>2.2 ***Key indicators*** for benchmarking are selected in consultation with key stakeholders<br>2.3 Like indicators of own practice are compared with benchmark indicators<br>2.4 Areas for improvement are identified |
| 3. Develop plans to improve business performance | 3.1 A consolidated list of required improvements is developed<br>3.2 Cost-benefit ratios for required improvements are determined<br>3.3 Work flow changes resulting from proposed improvements are determined<br>3.4 Proposed improvements are ranked according to agreed criteria<br>3.5 An action plan to implement the top ranked improvements is developed and agreed<br>3.6 ***Organizational structures*** are checked to ensure they are suitable |
| 4. Develop marketing and promotional plans | 4.1 The practice vision statement is reviewed<br>4.2 Practice ***objectives*** are developed/reviewed<br>4.3 Target markets are identified/refined<br>4.4 ***Market research data*** is obtained<br>4.5 ***Competitor analysis*** is obtained<br>4.6 ***Market position*** is developed/reviewed<br>4.7 Practice ***brand*** is developed<br>4.8 ***Benefits*** of practice/practice products/services are |

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| | identified<br>4.9 ***Promotion tools*** are selected/developed |
| 5. Develop business growth plans | 5.1 Plans to increase ***yield per existing client*** are developed<br>5.2 Plans to add new clients are developed<br>5.3 Proposed plans are ranked according to agreed criteria<br>5.4 An action plan to implement the top ranked plans is developed and agreed<br>5.5 Practice work practices are reviewed to ensure they support growth plans |
| 6. Implement and monitor plans | 6.1 Implementation plan is developed in consultation with all relevant stakeholders<br>6.2 Indicators of success of the plan are agreed<br>6.3 Implementation is monitored against agreed indicators<br>6.4 Implementation is adjusted as required |

| **Variable** | **Range** |
|---|---|
| Data required includes: | • organization capability<br>• appropriate business structure<br>• level of client service which can be provided<br>• internal policies, procedures and practices<br>• staff levels, capabilities and structure<br>• market, market definition<br>• market changes/market segmentation<br>• market consolidation/fragmentation<br>• revenue<br>• level of commercial activity<br>• expected revenue levels, short and long term<br>• revenue growth rate<br>• break even data<br>• pricing policy<br>• revenue assumptions<br>• business environment<br>• economic conditions<br>• social factors<br>• demographic factors<br>• technological impacts<br>• political/legislative/regulative impacts<br>• competitors, competitor pricing and response to pricing<br>• competitor marketing/branding<br>• competitor products |
| Competitive advantage | • services/products<br>• fees |

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| includes: | • location<br>• timeframe |
| Objectives should be 'SMART' | • Specific<br>• Measurable<br>• Achievable<br>• Realistic<br>• Time defined |
| Market research data includes: | • data about existing clients<br>• data about possible new clients<br>• data from internal sources<br>• data from external sources such as:<br>• trade associations/journals<br>• Yellow Pages small business surveys<br>• libraries<br>• Internet<br>• Chamber of Commerce<br>• client surveys<br>• industry reports<br>• secondary market research<br>• primary market research such as:<br>▪ telephone surveys<br>▪ personal interviews<br>▪ mail surveys |
| Competitor analysis | • competitor offerings<br>• competitor promotion strategies and activities<br>• competitor profile in the market place |
| SWOT analysis includes: | • internal strengths such as staff capability, recognized<br>• quality<br>• internal weaknesses such as poor morale,<br>• under-capitalization, poor technology<br>• external opportunities such as changing market and<br>• economic conditions<br>• external threats such as industry fee structures, strategic<br>• alliances, competitor marketing |
| Key indicators may include: | • salary cost and staffing<br>• personnel productivity (particularly of principals)<br>• profitability<br>• fee structure<br>• client base<br>• size staff/principal<br>• overhead/overhead control |
| Organizational structures include: | • legal structure (partnership, limited liability company, etc.)<br>• organizational structure/hierarchy<br>• reward schemes |
| Market position should include data on: | • product<br>• the good or service provided |

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| | • product mix<br>• the core product - what is bought<br>• the tangible product - what is perceived<br>• the augmented product - total package of consumer<br>• features/benefits<br>• product differentiation from competitive products<br>• new/changed products<br>• price and pricing strategies (cost plus, supply/demand, ability to pay, etc.)<br>• pricing objectives (profit, market penetration, etc.)<br>• cost components<br>• market position<br>• distribution strategies<br>• marketing channels<br>• promotion<br>• promotional strategies<br>• target audience<br>• communication<br>• promotion budget |
| Practice brand may include: | • practice image<br>• practice logo/letter head/signage<br>• phone answering protocol<br>• facility decor<br>• slogans<br>• templates for communication/invoicing<br>• style guide<br>• writing style<br>• AIDA (attention, interest, desire, action) |
| Benefits may include: | • features as perceived by the client<br>• benefits as perceived by the client |
| Promotion tools include: | • networking and referrals<br>• seminars<br>• advertising<br>• press releases<br>• publicity and sponsorship<br>• brochures<br>• newsletters (print and/or electronic)<br>• websites<br>• direct mail<br>• telemarketing/cold calling |
| Yield per existing client may be increased by: | • raising charge out rates/fees<br>• packaging fees<br>• reduce discounts<br>• sell more services to existing clients |

| Evidence Guide | |
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| Critical Aspects of Competence | The candidate must be able to demonstrate:<br>• ability to identify the key indicators of business performance<br>• ability to identify the key market data for the business<br>• knowledge of a wide range of available information sources<br>• ability to acquire information not readily available within a business<br>• ability to analyze data and determine areas of improvement<br>• ability to negotiate required improvements to ensure implementation<br>• ability to evaluate systems against practice requirements<br>• and form recommendations and/or make recommendations<br>• ability to assess the accuracy and relevance of information |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• data analysis<br>• communication skills<br>• computer skills to manipulate data and present information<br>• negotiation skills<br>• problem solving<br>• planning skills<br>• marketing principles<br>• ability to acquire and interpret relevant data<br>• current product and marketing mix<br>• use of market intelligence<br>• development and implementation strategies of promotion and growth plans |
| Underpinning Skills | • data analysis and manipulation<br>• ability to acquire and interpret required data<br>• current practice systems and structures<br>• sources of relevant benchmarking data<br>• methods of selecting relevant key benchmarking indicators<br>• communication skills<br>• working and consulting with others when developing plans for the business<br>• negotiation skills and problem solving<br>• using computers to manipulate, present and distribute information<br>• planning skills |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

| Occupational Standard: Cement Production Technical Operation Level III | |
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| **Unit Title** | **Maintain Quality System and Continuous Improvement Processes (Kaizen)** |
| **Unit Code** | **IND CPT3 14 1012** |
| **Unit Descriptor** | This unit of competence covers the skills and knowledge required to prevent process improvements in their own work from slipping back to former practices or digressing to less efficient practices. It covers responsibility for the day- to-day operation of the work/functional area and ensuring that quality system requirements are met and that continuous improvements are initiated and institutionalized. |

| Elements | Performance Criteria |
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| 1. Develop and maintain quality framework within work area | 1.1 Distribute and explain information about the enterprise's quality system to personnel<br>1.2 Encourage personnel to participate in improvement processes and to assume responsibility and authority<br>1.3 Allocate responsibilities for quality within work area in accordance with quality system<br>1.4 Provide ***coaching and mentoring*** to ensure that personnel are able to meet their responsibilities and quality requirements |
| 2. Maintain quality documentation | 2.1 Identify required quality documentation, including records of improvement plans and initiatives<br>2.2 Prepare and maintain quality documentation and keep accurate data records<br>2.3 Maintain document control system for work area<br>2.4 Contribute to the development and revision of quality manuals and work instructions for the work area<br>2.5 Develop and implement inspection and test plans for quality controlled products |
| 3. Facilitate the application of standardized procedures | 3.1 Ensure all required procedures are accessible by relevant personnel<br>3.2 Assist personnel to access relevant procedures, as required<br>3.3 Facilitate the resolution of conflicts arising from job<br>3.4 Facilitate the completion of required work in accordance with standard procedures and practices |

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| 4. Provide training in quality systems and improvement processes | 4.1 Analyze roles, duties and current competency of relevant personnel<br>4.2 Identify training needs in relation to quality system and ***continuous improvement processes (kaizen)***<br>4.3 Identify opportunities for skills development and/or training programs to meet needs<br>4.4 Initiate and monitor training and skills development programs<br>4.5 Maintain accurate training record |
| 5. Monitor and review performance | 5.1 Review performance outcomes to identify ways in which planning and operations could be improved<br>5.2 Use the organization's systems and ***technology*** to monitor and review progress and to identify ways in which planning and operations could be improved<br>5.3 Enhance ***customer service*** through the use of quality improvement techniques and processes<br>5.4 Adjust plans and communicate these to personnel involved in their development and implementation |
| 6. Build continuous improvement process | 6.1 Organize and facilitate improvement team<br>6.2 Encourage work group members to routinely monitor ***key process indicators***<br>6.3 Build capacity in the work group to critically review the relevant parts of the value chain<br>6.4 Assist work group members to formalize improvement suggestions<br>6.5 Facilitate relevant resources and assist work group members to develop implementation plans<br>6.6 Monitor implementation of improvement plans taking appropriate actions to assist implementation where required. |
| 7. Facilitate the identification of improvement opportunities | 7.1 Analyze the job completion process<br>7.2 Ask relevant questions of job incumbent<br>7.3 Encourage job incumbents to conceive and suggest improvements<br>7.4 Facilitate the trying out of improvements, as appropriate |
| 8. Evaluate relevant components of quality system | 8.1 Undertake regular audits of components of the quality system that relate to the work area<br>8.2 Implement improvements in the quality system in accordance with own level of responsibility and workplace procedures |

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| | 8.3 Facilitate the updating of standard procedures and practices<br>8.4 Ensure the capability of the work team aligns with the requirements of the procedure |

| **Variable** | **Range** |
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| Coaching and mentoring | May refer to:<br>• providing assistance with problem-solving<br>• providing feedback, support and encouragement<br>• teaching another member of the team, usually focusing on a specific work task or skill |
| Continuous improvement processes may include: | May include:<br>• cyclical audits and reviews of workplace, team and individual performance<br>• evaluations and monitoring of effectiveness<br>• implementation of quality systems, such as International Standardization for Organization (ISO)<br>• modifications and improvements to systems, processes, services and products<br>• policies and procedures which allow the organization to systematically review and improve the quality of its products, services and procedures<br>• seeking and considering feedback from a range of stakeholders<br>• Kaizen<br>• Enterprise-specific improvement systems |
| Technology | May include:<br>• computerized systems and software such as databases, project management and word processing<br>• telecommunications devices<br>• any other technology used to carry out work roles and responsibilities |
| Customer service | May be:<br>• internal or external<br>• to existing, new or potential clients |
| Key process indicators | Key process indicators may include:<br>• statistical process control data/charts<br>• orders<br>• lost time, injury and other OHS records<br>• equipment reliability charts, etc. |
| Continuous improvement tools | May include:<br>• statistics<br>• cause and effect diagrams<br>• fishbone diagram<br>• Pareto diagrams<br>• run charts |

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| | • X bar R charts<br>• PDCA<br>• Sigma techniques<br>• balanced scorecards<br>• benchmarking<br>• performance measurement<br>• upstream and downstream customers<br>• internal and external customers immediate and/or final |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Evidence of the following is essential:<br>• taking active steps to implement, monitor and adjust plans, processes and procedures to improve performance<br>• supporting others to implement the continuous improvement system/processes, and to identify and report opportunities for further improvement<br>• knowledge of principles and techniques associated with continuous improvement systems and processes<br>• assist others to follow standard procedures and practices<br>• assist others make improvement suggestions<br>• standardize and sustain improvements<br>Assessors should ensure that candidates can:<br>• implement and monitor defined quality system<br>• requirements and initiate continuous improvements within the work area<br>• apply effective problem identification and problem solving techniques<br>• strengthen customer service through a focus on continuous improvement<br>• implement, monitor and evaluate quality systems in the work area<br>• initiate quality processes to enhance the quality of performance of individuals and teams in the work area<br>• gain commitment of individuals/teams to quality principles and practices<br>• implement effective communication strategies<br>• encourage ideas and feedback from team members when developing and refining techniques and processes<br>• analyze training needs and implement training programs<br>• prepare and maintain quality and audit documentation |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• principles and techniques associated with:<br>– benchmarking<br>– best practice<br>– change management<br>– continuous improvement systems and processes |

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| | – quality systems<br>• range of procedures available and their application to different jobs<br>• applicability of takt time and muda to jobs<br>• identification and possible causes of variability in jobs<br>• continuous improvement process for organization<br>• questioning techniques<br>• methods of conceiving improvements<br>• suggestion and try out procedures<br>• relevant OHS<br>• quality measurement tools for use in continuous improvement processes<br>• established communication channels and protocols<br>• communication/reporting protocols<br>• continuous improvement principles and process<br>• enterprise business goals and key performance indicators<br>• enterprise information systems management<br>• enterprise organizational structure, delegations and responsibilities<br>• policy and procedure development processes<br>• relevant health, safety and environment requirements<br>• relevant national and international quality standards and protocols<br>• standard operating procedures (SOPs) for the technical work performed in work area<br>• enterprise quality system |
| Underpinning Skills | Demonstrates skills to:<br>• coach and mentor team members<br>• gain the commitment of individuals and teams to continuously improve<br>• innovate or design better ways of performing work<br>• communicate with relevant people<br>• prioritize and plan tasks related to encouraging and improving use of standardized procedures<br>• negotiate with others to resolve conflicts and gain commitment to standardized procedures<br>• facilitate other employees in improvement activities<br>• implement and monitor defined quality system requirements<br>• initiate continuous improvements within the work area<br>• apply effective problem identification and problem solving techniques<br>• strengthen customer service through a focus on continuous improvement<br>• implement, monitor and evaluate quality systems<br>• implement effective communication strategies<br>• encourage ideas and feedback from team members when developing and refining techniques and processes |

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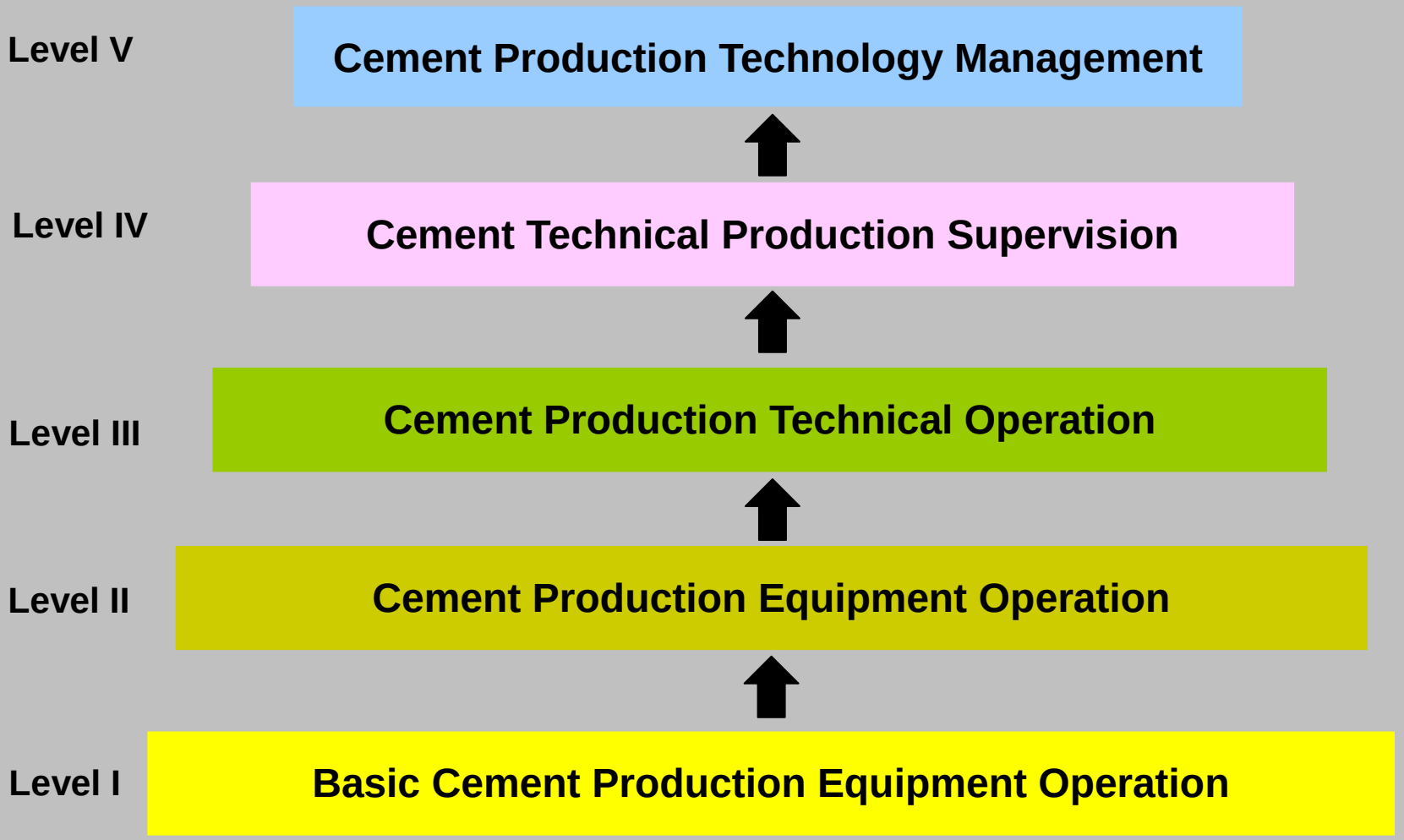
| | • analyze training needs and implementing training programs<br>• prepare and maintain quality and audit documentation |
| Resources Implication | Access may be required to:<br>• workplace procedures and plans relevant to work area<br>• specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the candidate<br>• documentation and information in relation to production, waste, overheads and hazard control/management<br>• enterprise quality manual and procedures<br>• quality control data/records |
| Methods of Assessment | Competence in this unit may be assessed by using a combination of the following to generate evidence:<br>• demonstration in the workplace<br>• suitable simulation<br>• oral or written questioning to assess knowledge of procedures and contingency management; principles and techniques associated with change management<br>• review of the audit process and outcomes generated by the candidates<br><br>Those aspects of competence dealing with improvement processes could be assessed by the use of suitable simulations and/or a pilot plant and/or a range of case studies and scenarios.<br><br>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competence which are difficult to assess directly. |
| Context of Assessment | Competence may be assessed in the work place or in a simulated workplace setting / environment. |

**Sector: Industry Development**
**Sub-Sector: Cement Production**



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