

STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN  
(NATIONAL OCCUPATIONAL SKILLS STANDARD)

WATERPROOFING SUPERVISION  
LEVEL 3



JABATAN PEMBANGUNAN KEMAHIRAN  
KEMENTERIAN SUMBER MANUSIA, MALAYSIA

WATERPROOFING SUPERVISION LEVEL 3

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**STANDARD PRACTICE**  
**NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR**  
**BUILDING & CONSTRUCTION**  
**WATERPROOFING SUPERVISION LEVEL 3**

**1. INTRODUCTION**

This is a waterproofing NOSS developed for CIDB. There is a high demand for skilled personnel in this field as the industry is developing rapidly. The waterproofing works intend to propel Malaysia to be at par with international construction industry.

The term “Waterproofing” describes objects relatively unaffected by water or resisting the ingress of water under specified conditions. In building construction, a structure needs waterproofing since concrete itself will not be watertight on its own. Hence, waterproofing acts as a barrier between the water and the building structure, preventing the passage of water.

Waterproofing works are implemented in both building and civil structure internally and externally in Malaysia. It is carried out to new and existing structure to provide comfortable and safe condition. When applied correctly, the structure can be long lasting and conducive to users.

Waterproofing is a necessary pre requisite for water exposed surface and hence there is a need for properly trained personnel at NOSS competency level 2 and 3. Having a competent workforce will renounce Malaysia as a centre of excellence in the region and help towards inward investment in the country.

Consequently, the development of this NOSS at Level 2 and 3, ‘Waterproofing Works’ is essential to ensure the sub sector will have complete standards and guidelines to be used by the industry.

**2. PRE-REQUISITES**

Based on the workshop findings, it was decided that the minimum requirement for those interested to enrol into this course are as follows:

- 17 years of age or older.
- Good eyesight.
- Medically and physically fit.
- Able to read, write and do simple calculation.

These pre-requisites are in line with minimum requirements set by Construction Industry Development Board (CIDB) and Department of Occupational Safety and Health (DOSH). With respect to the regulating bodies, the role is as follows:

### **Construction Industry Development Board (CIDB)**

As waterproofing is an essential aspect of the construction industry, the Board has taken into concentration all functions related to waterproofing practices. The functions as laid down under subsection 4 (1) of Act 520 are as follows:

- To promote and stimulate the development, improvement and expansion of Waterproofing Works;
- To advise and make recommendations to the Federal Government and the State Governments on matters affecting or connected with Waterproofing Works;
- To promote, stimulate and undertake research into any matter related to Waterproofing Works;
- To promote, stimulate and assist in the export of service related to Waterproofing Works;
- To provide consultancy and advisory services with respect to Waterproofing Works;
- To promote quality assurance in Waterproofing Works;
- To initiate and maintain Waterproofing Works information systems;
- To encourage the standardisation and improvement of Waterproofing Works techniques and materials;
- To provide, promote, review and coordinate training programmed organized by the public and private construction training centres for skilled construction workers and construction site supervisors;
- To accredit and register contractors and to cancel, suspend or reinstate the registration of any registered contractor; and
- To accredit and certify skilled Waterproofing Works personnel.

### **Department of Occupational Safety and Health (DOSH)**

As a regulatory body which enforces the occupational safety and health aspects in Malaysia, the role of DOSH is to study and review the policies and legislations of occupational safety and health. This in particular is enforced in risky occupations such as in the Waterproofing Works. The following acts are been enforced by DOSH:

- a) Occupational Safety and Health Act 1994 and its regulations.
- b) Factories and Machinery Act 1967 and its regulations.
- c) Part of Petroleum Act 1984 (Safety Measures) and its regulations.
- d) Guidelines, codes of practice, circulars.

With regard to the respective acts, DOSH comes forward to apply the functions as to:

- Conduct research and technical analysis on issues related to occupational safety and health at the workplace.
- Carry out promotional and publicity programs to employers, workers and the general public to foster and increase the awareness of occupational safety and health.
- Carry out promotional and publicity programs to employers, workers and the general public to foster and increase the awareness of occupational safety and health.
- Become a secretariat for the National Council regarding occupational safety and health

### 3. OCCUPATIONAL ANALYSIS (OA)

SECTOR	BUILDING & CONSTRUCTION
SUB SECTOR	CIVIL ENGINEERING
LEVEL/ AREA	WATERPROOFING
LEVEL 5	- <i>Not Available</i> -
LEVEL 4	WATERPROOFING WORKS QUALITY ASSURANCE INSPECTOR
LEVEL 3	WATERPROOFING WORKS SUPERVISOR
LEVEL 2	WATERPROOFING APPLICATOR
LEVEL 1	- <i>Not Available</i> -

Figure 1.1 Occupational Structure for Waterproofing

#### 4. OCCUPATIONAL AREA ANALYSIS (OAA)

<b>SECTOR</b>	<b>BUILDING &amp; CONSTRUCTION</b>
<b>SUB SECTOR</b>	<b>CIVIL ENGINEERING</b>
<b>LEVEL/ AREA</b>	<b>WATERPROOFING</b>
<b>LEVEL 5</b>	- <i>Not Available</i> -
<b>LEVEL 4</b>	WATERPROOFING WORKS QUALITY ASSURANCE
<b>LEVEL 3</b>	WATERPROOFING WORKS SUPERVISION
<b>LEVEL 2</b>	WATERPROOFING APPLICATION
<b>LEVEL 1</b>	- <i>Not Available</i> -

Figure 1.2 Occupational Area Structure for Waterproofing

## 5. DEFINITION OF COMPETENCY LEVEL

The NOSS is developed for various occupational areas. Candidates for certification must be assessed and trained at certain levels to substantiate competencies. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Malaysia Skills Certificate Level 1: (Operation and Production Level)	Competent in performing a range of varied work activities, most of which are routine and predictable.
Malaysia Skills Certificate Level 2: (Operation and Production Level)	Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and required individual responsibility and autonomy.
Malaysia Skills Certificate Level 3: (Supervisory Level)	Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.
Malaysia Skills Diploma Level 4: (Executive Level)	Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.
Malaysia Skills Advanced Diploma Level 5: (Managerial Level)	Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.



## 6. MALAYSIAN SKILL CERTIFICATION

The pre-requisite to pursue this course include possessing good reading, writing and communicating skills, besides physically and mentally healthy. All candidates must undergo on job training to attain knowledge and skills in Building & Construction.

Verified competent candidates who full fill Malaysian Skill Certification requirements shall be awarded with Level 2 and Level 3 certificate.

Assessment must be in accordance with the following:

NOSS outlines competency unit and competency profile in the Waterproofing working environment as required by the industry and has been developed as well as documented following extensive collaboration across key Malaysian organisations. It is imperative that the duties and tasks outlined follow a high standard as well as consistency throughout the assessment process. This can only be done by stipulating a precise framework in which the assessment of competency unit and curriculum of competency unit must be conducted. The training & assessment of Waterproofing personnel must be committed in accordance with *JPK* policy and in adherence to Building & Construction rigorous process and standard as follows:

- a) The final assessment of competency must include the combination of documented continuous assessment conducted by the facilitator during training and the results of post-training examination;
- b) The post-training examination must be practical in nature and involve demonstration & application of the duties and tasks utilizing real equipment and real-world examples;
- c) The competency and curriculum unit as outlined in this NOSS must be assessed throughout the training program and during a post-training examination;
- d) The learning environment and facilities need to be in accordance with the requirements of the Building & Construction;
- e) The development and assessment of the competency and curriculum unit profile must demonstrate transferable skills;
- f) The development and assessment of the competency unit & competency profile must include documentation by candidates both during training and examination; and
- g) All training and assessment materials must be mapped and verified to be in accordance with the NOSS Waterproofing Works by a panel of industry subject matter experts appointed by JPK with the support of the Building & Construction industry.

## 7. JOB COMPETENCIES

- a) *Waterproofing Application* personnel in Level 2 are competent in performing core competency units:
- Waterproofing Surface Preparation
  - Waterproofing Material Application
- b) *Waterproofing Supervision* personnel in Level 3 are competent in performing core competency units:
- Waterproofing Testing & Commissioning
  - Waterproofing Verification Works
  - Waterproofing Material Handling

Optionally *The Waterproofing* personnel in Level 2 are competent in performing the following Elective competencies:-

- Supervisory Functions

## 8. WORKING CONDITIONS

Generally, a waterproofing personnel work is in accordance with work schedules and is responsible to meet contract requirements. He is also responsible to adhere to construction site regulations and waterproofing operating procedures and specifications. He must keep abreast with the rapidly changing waterproofing technology.

He normally works in a team and is required to adhere to safety and security procedures under working environment by OSHA.

## 9. EMPLOYMENT PROSPECTS

A skilled local waterproofing personnel has a high employment prospect both locally and internationally. A CIDB-recognised local expertise personnel is considered highly skilled and knowledgeable in waterproofing construction industry in other countries.

This in turn increases the demand for skilled personnel in this field to be employed globally.

As Malaysia moves towards standard minimum wages according to specialisation of works, waterproofing works competency recognition will increase employment prospects and support the growth.

Employment growth in the waterproofing industry is significant and is in current demand. The industry is growing rapidly in Malaysia and there is a shortage of well-trained personnel in this area.

Other related occupations with respect to employment opportunities are:

- Civil & Building Consultant
- Civil Contractor
- Oil and Gas
- Boilers and Pressure vessels
- Shipbuilding
- Construction
- Industrial machinery
- Aerospace
- Automotive
- Vocational training
- Civil & Building Consultant
- Civil Contractor

Other related industries with respect to employment opportunities are:

- Education
- Training Centres
- Lecturers
- Facilitators
- Sales and Marketing
- Building Material Supplier

## 10. SOURCES OF ADDITIONAL INFORMATION

Construction Industry development Board (CIDB)  
Tingkat 7, Grand Seasons Avenue, 72, Jalan Pahang,  
53000 Kuala Lumpur  
Tel: 603-2617 0200  
Fax: 603-2617 0220  
Email: [cidb@cidb.gov.my](mailto:cidb@cidb.gov.my)  
Web: <http://www.cidb.gov.my>  
Department of Occupational Safety and Health (DOSH)

Ministry of Human Resource,  
Level 2, 3 & 4, Block D3, Complex D  
Federal Government Administrative Centre  
62530 W. P. Putrajaya  
Tel: 603 - 8886 5000  
Fax: 603 - 8889 2443  
Email: [jkkp@mohr.gov.my](mailto:jkkp@mohr.gov.my)  
Web: <http://www.dosh.gov.my>

Department of Standards Malaysia (Standards Malaysia)  
Century Square, Level 1 & 2, Block 2300, Jalan Usahawan,  
63000 Cyberjaya, Selangor Darul Ehsan, Malaysia  
Tel: 603-8318 0002  
Fax: 603-8319 3131  
Email: [central@standardsmalaysia.gov.my](mailto:central@standardsmalaysia.gov.my)  
Web: <http://www.standardsmalaysia.gov.my>

SIRIM Berhad  
No. 1, Persiaran Dato' Menteri, Seksyen 2,  
Peti Surat 7035, 40700 Shah Alam  
Selangor Darul Ehsan  
Tel: 603-55446000  
Fax: 603-55108095  
Email: [web@sirim.my](mailto:web@sirim.my)  
Web: <http://www.sirim.my>

## **11. APPROVAL DATE**

The National Skills Development Board (MPKK), Ministry of Human Resources has agreed and endorsed this Standard on .....

## **12. ACKNOWLEDGEMENT**

The Director General of DSD would like to extend his gratitude to the organisations and individuals who have been involved in developing this standard.

**13. COMMITTEE MEMBERS FOR DEVELOPMENT OF STANDARD PRACTICE (SP),  
COMPETENCY PROFILE CHART (CPC) AND COMPETENCY PROFILE (CP)**

**WATERPROOFING SUPERVISION LEVEL 3**

<b>PANEL</b>		
1.	En. Mohd Azmi Affendi bin Ahmad Tamizi	Jurutera Projek Teguh Amani Sdn Bhd
2.	Ir. Tn. Hj. Md. Noor bin Mahmud	Pengarah Jabatan Kejuruteraan Majlis Perbandaran Kajang
3.	Dr. Razif bin Muhammed Nordin	Pensyarah Bahagian Polimer Fakulti Sains Gunaan UiTM Perlis
4.	Dr. Mohd Yazah bin Mat Raschid	Dekan Jabatan Senibina Fakulti Rekabentuk & Senibina UPM Serdang
5.	En. Juminan bin Samad	Pengarah Jabatan Rekabentuk Bandar & Bangunan DBKL
6.	Sr. Norizan binti Sulaiman	Juruukur Bangunan Jabatan Rekabentuk Bandar & Bangunan DBKL
7.	Profesor Madya Dr. Zakiah Ahmad	Pengarah Institut Kejuruteraan Infrastruktur & Pengurusan Mampan Fakulti Kejuruteraan Awam UiTM Shah Alam
8.	En. Johari bin Ahmad	Ketua Pen. Pengarah Kanan (Senggara) JKR W.P. Kuala Lumpur
9.	En. Mukhtar bin Mat Ali	Pengajar ABM Wilayah Timur
10.	En. Yeo Yew Boon	Pengurus Repair Resources Sdn Bhd
11.	En. Soh Teck Hin	Pengurus Binaan Zelan Holdings (M) Sdn Bhd
12.	Tn. Hj. Azman bin Wan Ab. Rahman	Jurutera Daerah JKR Seremban
13.	Profesor Dr. Azmi bin Ibrahim	Dekan Fakulti Kejuruteraan Awam Universiti Teknologi Mara
<b>FACILITATOR</b>		
11.	Pn. Siti Rohanah binti Ahmad	CIDB Kuala Lumpur
<b>CO-FACILITATOR</b>		
12.	En. Mohd Fadil bin Muhamad	CIDB Kuala Lumpur
13.	En. Mohd Azry bin Mohd Ariffin	CIDB Kuala Lumpur

**14. COMMITTEE MEMBERS FOR DEVELOPMENT OF STANDARD PRACTICE (SP),  
COMPETENCY PROFILE CHART (CPC) AND COMPETENCY PROFILE (CP)**

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3.	Dr. Razif bin Muhammed Nordin	Pensyarah Bahagian Polimer Fakulti Sains Gunaan UiTM Perlis
4.	Dr. Mohd Yazah bin Mat Rashid	Dekan Jabatan Senibina Fakulti Rekabentuk & Senibina UPM Serdang
5.	En. Juminan bin Samad	Pengarah Jabatan Rekabentuk Bandar & Bangunan DBKL
6.	Sr. Norizan binti Sulaiman	Juru Ukur Bangunan Jabatan Rekabentuk Bandar & Bangunan DBKL
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13.	En. Mohd Azry bin Mohd Ariffin	CIDB Kuala Lumpur

**8. COMMITTEE MEMBERS FOR DEVELOPMENT OF STANDARD PRACTICE (SP), COMPETENCY PROFILE CHART (CPC), COMPETENCY PROFILE (CP) AND CURRICULUM OF COMPETENCY UNIT (CoCU).**

**WATERPROOFING SUPERVISION LEVEL 3**

<b>PANEL</b>		
1.	En. Mohd Azmi Affendi bin Ahmad Tamizi	Jurutera Projek Teguh Amani Sdn Bhd
2.	Mohamed Norized Bin Che'Man	Penolong Pengarah Jabatan Kejuruteraan Majlis Perbandaran Kajang
3.	Dr. Razif bin Muhammed Nordin	Pensyarah Bahagian Polimer Fakulti Sains Gunaan UiTM Perlis
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11.	Profesor Dr. Azmi bin Ibrahim	Dekan Fakulti Kejuruteraan Awam Universiti Teknologi Mara
12.	Pn.Siti Salwana binti Mohd Nawayai	Pensyarah Politeknik Premier Sultan Salahuddin Abdul Aziz Shah, Seksyen U1, Persiaran Usahawan, 40150 Shah Alam, Selangor.
<b>FACILITATOR</b>		
11.	Pn. Siti Rohanah Binti Ahmad	CIDB Kuala Lumpur
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COMPETENCY PROFILE CHART (CPC), COMPETENCY PROFILE (CP) AND  
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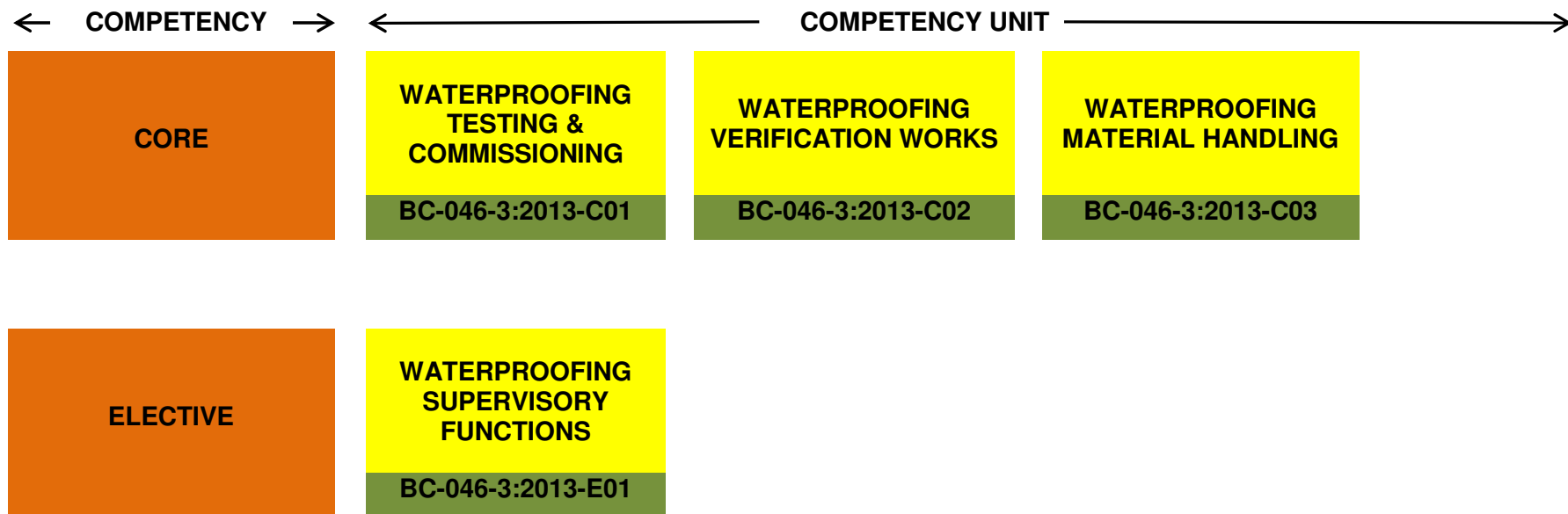
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11.	Profesor Dr. Azmi bin Ibrahim	Dekan Fakulti Kejuruteraan Awam Universiti Teknologi Mara
12.	Pn.Siti Salwana binti Mohd Nawayai	Pensyarah Politeknik Premier Sultan Salahuddin Abdul Aziz Shah, Seksyen U1, Persiaran Usahawan, 40150 Shah Alam, Selangor.
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12.	En. Mohd Fadil bin Muhamad	CIDB Kuala Lumpur
13.	En. Mohd Azry bin Mohd Ariffin	CIDB Kuala Lumpur



**COMPETENCY PROFILE CHART (CPC)**

<b>SECTOR</b>	<b>BUILDING &amp; CONSTRUCTION</b>		
<b>SUB SECTOR</b>	<b>CIVIL ENGINEERING</b>		
<b>JOB AREA</b>	<b>WATERPROOFING WORKS SUPERVISION</b>		
<b>JOB LEVEL</b>	<b>LEVEL 3</b>	<b>JOB AREA CODE</b>	<b>BC-046-3-2013</b>



## COMPETENCY PROFILE (CP)

<b>Sub Sector</b>	<b>CIVIL ENGINEERING</b>
<b>Job Area</b>	<b>WATERPROOFING WORKS SUPERVISION</b>
<b>Level</b>	<b>THREE (3)</b>

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
1. Waterproofing Testing and Commissioning		<p>This competency unit describes the skills, knowledge and attitude requirements in waterproofing testing and commissioning.</p> <p>Testing and Commissioning Works are normally carried out on reinforced concrete surfaces which are designed to retain fluid at some point in time once they have been waterproofed especially for new works.</p> <p>The person who is competent in waterproofing testing and commissioning shall be able to;</p> <p>Mobilise workforce and waterproofing testing apparatus, Coordinate water ponding perimeter kerb construction, install waterproofing testing apparatus, perform water ponding test and prepare testing and commissioning</p>	<p>1. Mobilise workforce and waterproofing testing apparatus</p> <p>2. Coordinate water ponding perimeter kerb construction</p>	<p>1.1 Testing work force planned according to job requirement.</p> <p>1.2 Distance, location and accessibility to site confirmed.</p> <p>1.3 Requested testing apparatus prepared according to job requirement.</p> <p>1.4 Mode of travelling mobilization arranged according to site accessibility.</p> <p>1.5 Workforce and testing apparatus arrival communicated and ascertained</p> <p>2.1 Testing area identified in accordance with British Standard.</p> <p>2.2 Perimeter of the testing area</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		<p>report in accordance with British Standard (BS) or equivalent.</p> <p>The outcome of this CU is to certify the waterproofed surface area could retain fluid within warranty period.</p>	<p>3. Install waterproofing testing apparatus</p> <p>4. Perform water ponding test.</p>	<p>kerb marked and closed.</p> <p>2.3 Kerb construction instruction conveyed and understood by waterproofing applicator.</p> <p>2.4 Kerb construction progress monitored.</p> <p>2.5 Water tightness, continuity, dimension and quality of kerb checked.</p> <p>3.1 Visible, highest point and accessible testing apparatus location marked.</p> <p>3.2 Testing apparatus assembled at the marked location according to manufacturer's specification.</p> <p>3.3 Ascertained water level at test area marked.</p> <p>3.4 Calibrated and fully functional apparatus ascertained.</p> <p>4.1 Fill up water until marked level.</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			5. Prepare testing and commissioning report	4.2 Bench marked water level at specific time interval monitored. 4.3 Water level height differential obtained. 5.1 Water ponding test result collected. 5.2 Organize data formatted. 5.3 Ponding test report completed and submitted for evaluation.

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
<p>2. Waterproofing Verification Works</p>		<p>This competency unit describes the skills, knowledge and attitude requirements in waterproofing verification works. Verification is a process to ensure that waterproofing works has been carried out in compliance with relevant specification and regulation.</p> <p>The person who is competent in waterproofing verification works shall be able to:-</p> <p>Compile documents, check and verify waterproofing works in accordance with manufacturer's specification, Malaysia Acts and Regulations and British Standard (BS) or equivalent, and update waterproofing works documents.</p> <p>The outcome of this CU is to ensure quality waterproofing works and updated documents.</p>	<p>1. Compile waterproofing works documentation.</p>	<p>1.1 Type of waterproofing materials identified and obtained as specified in project contract documents.</p> <p>1.2 Waterproofing material's technical data sheets of waterproofing materials collated.</p> <p>1.3 Waterproofing material's comply to manufacturer according to contract specification.</p> <p>1.4 Area to be waterproofed identified from construction drawing.</p> <p>1.5 Project completion timeframe obtained from contract document.</p> <p>1.6 Verification checklist compiled for site references.</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			2. Check waterproofing works.	<p>2.1 Waterproofing material's suitability checked in accordance with contract document specifications.</p> <p>2.2 Usability of waterproofing materials verified for usage before expired date and conforming to manufacturer's specification.</p> <p>2.3 Work area confirmed as per construction drawings.</p> <p>2.4 Sequence of surface preparation reviewed and communicated to waterproofing applicator.</p> <p>2.5 Surface preparation of working area validated conforming to manufacturer's specifications.</p> <p>2.6 Application process, as per manufacturer's instructions, recapped and communicated to waterproofing applicator.</p> <p>2.7 Waterproofing material applied as per manufacturer's</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			<p>3. Verify waterproofing works completion</p> <p>4. File waterproofing works document</p>	<p>specification.</p> <p>3.1 Waterproofing checklist compiled in orderly manner.</p> <p>3.2 All checklist criteria are marked and checked.</p> <p>3.3 Waterproofed area checked according to as built drawings.</p> <p>3.4 Actual areas waterproofed confirmed.</p> <p>3.5 All checklist criteria marked and signed off</p> <p>.</p> <p>4.1 Verification checklist filled according to main contractor's or client's requirements.</p> <p>4.2 Daily report prepared for work done and material used according to company's requirement.</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
3. Waterproofing material handling		<p>This competency unit describes the skills, knowledge and attitude requirements in waterproofing material handling. This work process is to ensure smooth flow of waterproofing works by having sufficient quantity and correct type of waterproofing products at work site. Safe handling is required due to the hazardous nature of some of the waterproofing materials. Proper personal protective equipment is a requirement.</p> <p>The person who is competent in waterproofing material handling</p>	1. Check waterproofing material inventory	<p>4.3 Project QC document compiled in sequence according to contractor's filing requirement.</p> <p>4.4 File document completeness (warranty and maintenance methods) checked as per organizational requirements</p> <p>4.5 Project documents submitted within stipulated timeframe.</p> <p>1.1 Type of waterproofing material confirmed as per contract documents</p> <p>1.2 Bulk quantity of waterproofing material available in store ascertained with storekeeper</p> <p>1.3 Specified quantity of waterproofing material reserved for ongoing projects obtained.</p> <p>1.4 Inventory recorded for stock balance.</p>



## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		<p>shall be able to:-</p> <p>Check waterproofing material inventory, prepare waterproofing stock requisition, monitor material storage, prepare stock inventory documents and coordinate material disposal in accordance with manufacturer's specification, Malaysia Acts and Regulations and British Standard (BS) or equivalent.</p> <p>The outcome of this CU is to ensure uninterrupted waterproofing materials supply, correct specification, minimizes material wastage, timely disposal of expired, surplus and used waterproofing materials.</p>	<p>2. Prepare waterproofing stock requisition</p>	<p>2.1 Waterproofing area identified from construction drawings</p> <p>2.2 Waterproofing area measured from construction drawings</p> <p>2.3 Quantity of waterproofing material for project calculated from construction drawing and material technical data sheet</p> <p>2.4 Quantity of waterproofing material to order determined from difference of material availability and material needed for project</p> <p>2.5 Waterproofing material requisition form prepared</p> <p>2.6 Material requisition form submitted to relevant personnel which include managers, purchasers or vendors</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			3. Monitor material storage	<p>3.1 Location, storage condition, protection, security, size, and storage method identified in accordance with technical data sheet.</p> <p>3.2 Size, location, and capacity of storage area made available and consented by main contractor / client.</p> <p>3.3 Quantity of waterproofing material required daily needs and compared to supply availability estimated.</p> <p>3.4 Coordinate transport and time delivery.</p> <p>3.5 Quantities of waterproofing material accepted and verified in accordance with delivery order</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			<p>4. Prepare stock inventory documents</p>	<p>3.6 Complete waterproofing materials storage operation coordinated and complied.</p> <p>3.7 Operating hours, procedure and location of store conveyed to waterproofing applicator.</p> <p>4.1 Quantity of waterproofing material received at site compiled and recorded from delivery order forms.</p> <p>4.2 Quantity of waterproofing material removed from site store recorded</p> <p>4.3 Actual quantity of waterproofing material utilised at site determined from used wrappings</p> <p>4.4 Quantity of stock inventory at site store updated</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			5. Coordinate material disposal	<p>5.1 Hazardous and non-hazardous waterproofing waste collection area established with the main contractor site supervisor</p> <p>5.2 Waterproofing waste collection duties assigned to waterproofing applicator.</p> <p>5.3 Amount waterproofing waste collected estimated in meter cube.</p> <p>5.4 Waterproofing waste collection by licensed contractor scheduled.</p> <p>5.5 Waterproofing waste collection recorded upon collection by licensed contractor</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
4 Supervisory Functions		<p>This competency unit describes the skills, knowledge and attitude requirements for supervisory functions.</p> <p>Supervisory functions cover coordination, monitoring and verification of waterproofing works.</p> <p>The person who is competent in supervisory functions shall be able to:-</p> <p>Schedule project resources, coordinate project activities, and monitor staff competencies in accordance with job description and worker specification.</p> <p>The outcome of this CU is to ensure quality waterproofing works.</p>	1. Schedule project resources	<p>1.1 Specifications, such as blueprints, contract documents are interpreted to determine construction requirements or to plan procedures.</p> <p>1.2 Construction requirements such as construction cost, job scopes and project timeline are determined with stakeholder's requirements.</p> <p>1.3 Equipments, tools and materials are determined in accordance with manufacturer's requirements.</p> <p>1.4 Job scopes of the construction are determined in accordance with the manufacturer's requirements in order to determine the kind of human resources need and its quantity.</p> <p>1.5 Quantity and quality of workers needed for the project are identified.</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			2. Coordinate project activities	<p>1.6 Task assignment and resource allocation charts are produced.</p> <p>2.1 Workers are identified in accordance with construction job scopes and time frame.</p> <p>2.2 Workers are assigned task and an expectation made understood in accordance with job scope.</p> <p>2.3 Weekly briefing to workers is conducted such as:</p> <ul style="list-style-type: none"> <li>• Safety</li> <li>• Technical</li> </ul> <p>2.4 Work progress is examined.</p> <p>2.5 Equipment conditions and availability is inspected.</p> <p>2.6 The safety at waterproofing area is verified in accordance with project requirements.</p> <p>2.7 Worker and construction problems are communicated to managerial and technical personnel.</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			3. Monitor staff competencies	<p>2.8 Solutions to waterproofing worker and construction problems are identified in consultation with managerial and technical personnel.</p> <p>2.9 Waterproofing work activities with other construction project activities are coordinated to be in line with overall project timeline.</p> <p>2.10 Progress reports are produced and communicated to project stakeholders.</p> <p>3.1 Key performance indicators are developed.</p> <p>3.2 KPIs are communicated and made understood.</p> <p>3.3 Workers appraisal reports are prepared.</p> <p>3.4 Workers performance is reviewed.</p>

## COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				<p>3.5 Improvement areas are discussed and recorded.</p> <p>3.6 On-job training content and schedules are prepared</p> <p>3.7 Workers are trained in construction methods, equipment operation, safety procedures, or company policies.</p> <p>3.8 Competency of on-job training is verified.</p> <p>3.9 On-job training completion is recorded.</p>



## CURRICULUM of COMPETENCY UNIT (CoCU)

<b>Sub Sector</b>		<b>CIVIL ENGINEERING</b>						
<b>Job Area</b>		<b>WATERPROOFING WORKS SUPERVISION</b>						
<b>Competency Unit Title</b>		<b>WATERPROOFING TESTING AND COMMISSIONING</b>						
<b>Learning Outcome</b>		<p>The person who is competent in this CU shall be able to certify the waterproofed surface area could retain fluid within warranty period. Upon completion of this competency unit, trainees will be able to: -</p> <ul style="list-style-type: none"> <li>• Mobilise workforce and waterproofing testing apparatus</li> <li>• Coordinate water ponding perimeter kerb construction</li> <li>• Install waterproofing testing apparatus</li> <li>• Perform water ponding test</li> <li>• Prepare testing and commissioning report</li> </ul>						
<b>Competency Unit ID</b>			<b>Level</b>	3	<b>Training Duration</b>	200 Hours	<b>Credit Hours</b>	20
<b>Work Activities</b>	<b>Related Knowledge</b>	<b>Related Skills</b>	<b>Attitude/Safety/Environmental</b>	<b>Training Hours</b>	<b>Delivery Mode</b>	<b>Assessment Criteria</b>		
1. Mobilise workforce and waterproofing testing apparatus	i. Methods of communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> ii. Materials and equipments familiarisation <ul style="list-style-type: none"> <li>• Types</li> <li>• Function</li> <li>• Condition</li> </ul> iii. Workforce requirement iv. Accessibility v. Types of vehicles vi. Information technology vii. Waterproofing works timeline viii. Drawing interpretation <ul style="list-style-type: none"> <li>• Layout drawings</li> </ul>			10	Lecture	i. Work force schedule prepared ii. Specified area and accessibility reported iii. Correct waterproofing testing apparatus chosen iv. Travelling itineraries prepared v. Workforce and waterproofing testing		

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> <li>• Scale measurement</li> <li>• Legends</li> <li>• Cross section</li> </ul> ix. Apparatus and equipments familiarisation <ul style="list-style-type: none"> <li>• Types</li> <li>• Function</li> </ul>					apparatus arrival reported
		i. Plan work force requirements ii. Locate area and accessibility iii. Prepare waterproofing testing apparatus iv. Arrange travelling mobilisation v. Ascertain workforce and waterproofing testing apparatus arrival at site	<u>Attitude</u> i. Efficient and result oriented ii. Adhere to schedule iii. Familiar with current technology  <u>Safety</u> i. Obey rules and regulation	20	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
2. Coordinate water ponding perimeter kerb construction	i. Construct kerbs <ul style="list-style-type: none"> <li>• Materials</li> <li>• Mixing ratio</li> </ul>			10	Lecture	i. Testing area listed ii. Kerb location indicated
		i. Identify testing area ii. Mark kerb location iii. Instruct kerb construction iv. Monitor kerb construction v. Check kerb integrity	<u>Attitude</u> i. Adhere to Standard Operation Procedure (SOP) ii. Apply team work in performing tasks  <u>Environment</u> i. Maintain neatness and tidiness upon completion	30	Demonstration & Observation	iii. Kerb construction waterproofing applicator briefed iv. Kerb construction checklist filled out v. Water tightness, continuity, dimension and quality of kerb declared
3. Install waterproofing testing apparatus	i. Levelling instruments ii. Waterproofing works timeline			10	Lecture	i. Marked testing apparatus location indicated
		i. Mark testing apparatus location ii. Assemble testing apparatus iii. Mark water ponding level iv. Test apparatus functionality		24	Demonstration & Observation	ii. Testing apparatus correctly set up iii. Water ponding level indicated iv. Apparatus function test

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Attitude</u> i. Accurate in departmental operation monitoring procedures ii. Precise in operation technique iii. Apply team work in performing tasks  <u>Environment</u> i. Maintain neatness and tidiness upon completion			results submitted
4. Perform water ponding test	i. Comprehend specifications • Calculations			12	Lecture	i. Testing area filled up with water to marked level
		i. Flood testing area ii. Monitor water subside iii. Obtain final assessment	<u>Attitude</u> i. Adhere to Standard Operation Procedure (SOP) ii. Thorough in data input  <u>Safety</u> i. Barricade to	28	Demonstration & Observation	ii. Progress water level report filled out iii. Water level height differential recorded

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			OSHA standards			
5. Prepare testing and commissioning report	i. Dismantling procedure ii. Discharging ponding water procedure <ul style="list-style-type: none"> <li>• Manual discharging</li> <li>• Mechanical discharging</li> </ul> iii. Storage liaison procedure iv. Awareness of testing procedures v. Evaluate test results vi. Methods of data compilation <ul style="list-style-type: none"> <li>• Summary</li> <li>• Report</li> </ul>			10	Lecture	i. Water ponding test result acquired ii. Test result data compiled iii. Ponding test report submitted
		i. Obtain water ponding test result ii. Organise test result data iii. Produce ponding test report	<u>Attitude</u> i. Positive thinking ii. Analytical in reviewing test results iii. Knowledgeable and meticulous when producing operation strength and weaknesses report.	30	Demonstration & Observation	

## Employability Skills

Core Abilities	Social Skills
01.01 Identify and gather information 01.02 Document information, procedures or processes. 01.03 Utilise basic IT applications 01.04 Analyse information 02.03 Communicate clearly 02.04 Prepare brief reports and checklists using standard forms 02.08 Prepare pictorial and graphic information. 02.10 Prepare reports and instructions 02.11 Convey information and ideas to people 03.05 Demonstrate safety skills 03.08 Develop and maintain a cooperation within work group 03.13 Develop and maintain team harmony and resolve conflicts 03.14 Facilitate and coordinate teams and ideas 03.15 Liaise to achieve identified outcomes 03.16 Identify and assess client/customer needs 04.01 Organise own work activities 05.01 Implement project/work plans 05.02 Inspect and monitor work done and/or in progress 06.02 Comply with and follow chain of command. 06.06 Monitor and correct performance of systems 06.07 Develop and maintain networks	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

## Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Water pump 2. Hose 3. Water Tank 4. Gauges 5. Measuring Tape 6. Cement 7. Sand	1:20 1:20 1:20 1:2 1:1 As per required As per required

8. Dumpy Level & Tripod	1:1
9. Timber Members	1:2
10. Spade	1:1
11. Hammer	1:1
12. Air Compressor	1:20
13. Generator Set	1:20
14. Stationery	As per required
15. Computer	1:2
16. Clean Water	As per required
17. Portable Mixing Drum	1:20

## References

<b>REFERENCES</b>
<ol style="list-style-type: none"> <li>1. BS 1881:1983 British Standard Institution</li> <li>2. Malaysia Uniform Building By-Laws 1984</li> <li>3. MS SIRIM ISC D : Building, Construction and Civil Engineering</li> <li>4. Michael T. Kubal (2008). Construction Waterproofing Handbook: Second Edition. McGraw-Hill Professional.</li> <li>5. ISBN 978-0071489737</li> </ol>

## CURRICULUM of COMPETENCY UNIT (CoCU)

<b>Sub Sector</b>		<b>CIVIL ENGINEERING</b>						
<b>Job Area</b>		<b>WATERPROOFING</b>						
<b>Competency Unit Title</b>		<b>WATERPROOFING VERIFICATION WORK</b>						
<b>Learning Outcome</b>		<p>The person who is competent in this CU shall be able to ensure uninterrupted waterproofing materials supply, correct specification, minimizes material wastage, timely disposal of expired, surplus and used waterproofing materials. Upon completion of this competency unit, trainees will be able to: -</p> <ul style="list-style-type: none"> <li>• Compile waterproofing works documentation</li> <li>• Check waterproofing works</li> <li>• Verify waterproofing works completion</li> <li>• File waterproofing works document</li> </ul>						
<b>Competency Unit ID</b>		<b>BC-046-3:2013-C02</b>	<b>Level</b>	3	<b>Training Duration</b>	200 Hours	<b>Credit Hours</b>	20
<b>Work Activities</b>	<b>Related Knowledge</b>	<b>Related Skills</b>	<b>Attitude/Safety/Environmental</b>	<b>Training Hours</b>	<b>Delivery Mode</b>	<b>Assessment Criteria</b>		
1. Compile waterproofing works documentation	i. Type of contract documents <ul style="list-style-type: none"> <li>• Specification</li> <li>• Bill of quantity</li> <li>• Construction drawing</li> </ul> ii. Contract documents information <ul style="list-style-type: none"> <li>• Waterproofing materials</li> <li>• Waterproofing area</li> </ul> iii. Technical data sheet information <ul style="list-style-type: none"> <li>• Coverage of waterproofing material</li> <li>• Surface preparation</li> </ul>			23	Lecture	i. Specified waterproofing materials acquired ii. Waterproofing materia technical data sheet compiled iii. Waterproofing materials matched to specifications iv. Working area and project completion timeframe listed v. Verification		



Work Activities	Related Knowledge	Related Skills	Attitude/Safety/Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> <li>• Mixing method</li> <li>• Application method</li> <li>• Cleaning method</li> </ul> iv. Standards documents <ul style="list-style-type: none"> <li>• Material Safety Data Sheet</li> <li>• B.S. Standards/ ASTM Standards/ M.S. Standards</li> </ul> v. Contract documents information <ul style="list-style-type: none"> <li>• Completion period</li> </ul>					checklist produced
		i. Obtain specified waterproofing materials ii. Collect waterproofing materials' data sheet iii. Confirm waterproofing materials iv. Identify working area v. Identify project completion timeframe vi. Compile verification checklist	<u>Attitude</u> i. Thorough in extracting and recording the information	31	Demonstration & Observation	
2. Check waterproofing works	i. Methods of Communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> ii. Waterproofing material			14	Lecture	i. Waterproofing material confirmed ii. Usability of waterproofing

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> <li>properties <ul style="list-style-type: none"> <li>• Expiry date</li> <li>• Key physical properties</li> </ul> </li> <li>iii. Surface preparation <ul style="list-style-type: none"> <li>• Size</li> <li>• Equipment</li> <li>• Procedure</li> <li>• Completion condition</li> </ul> </li> <li>iv. Waterproofing application <ul style="list-style-type: none"> <li>• Equipment</li> <li>• Material</li> <li>• Procedure</li> <li>• Completion condition</li> </ul> </li> </ul>					<ul style="list-style-type: none"> <li>materials confirmed</li> <li>iii. Specified work area ascertained</li> <li>iv. Sequence of surface preparation process corrected</li> <li>v. Surface preparation checklist endorsed</li> <li>vi. Re-cap session conducted</li> <li>vii. Waterproofing material application checklist endorsed</li> </ul>
		<ul style="list-style-type: none"> <li>i. Check waterproofing materials</li> <li>ii. Verify usability of waterproofing materials</li> <li>iii. Confirm work area</li> <li>iv. Check surface preparation process</li> <li>v. Validate surface preparation of working area</li> <li>vi. Recap process of waterproofing material application</li> <li>vii. Verify waterproofing material application</li> </ul>		57	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Safety</u> i. Safety in working process ii. Safety conscious in working condition iii. Safety regulation in work site			
3. Verify waterproofing works completion	i. Method of communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> ii. Measurement <ul style="list-style-type: none"> <li>• Unit</li> <li>• Techniques</li> <li>• Equipment</li> </ul> iii. Waterproofed area calculation iv. Site facilities <ul style="list-style-type: none"> <li>• Type</li> </ul> v. Standard Operating Procedures <ul style="list-style-type: none"> <li>• Work completion document</li> </ul>			13	Lecture	i. Waterproofing checklist produced ii. Waterproofing works compliance to job requirements confirmed iii. Waterproofed area completion checklist submitted
	i. Compile waterproofing checklist ii. Check waterproofing works specification iii. Check waterproofed area iv. Confirm area waterproofed v. Endorse checklist			26	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<u>Environment</u> i. Cleanliness oriented			
4. File waterproofing works document	i. Method of communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> ii. Standard Operating Procedures <ul style="list-style-type: none"> <li>• Work completion</li> <li>• Daily report</li> <li>• Time card</li> </ul> iii. Documentation <ul style="list-style-type: none"> <li>• Type</li> <li>• Filing</li> <li>• Filing</li> </ul> iv. Organisation structure <ul style="list-style-type: none"> <li>• Position</li> <li>• Task/ Responsibility</li> </ul>			10	Lecture	i. Completed final waterproofing work documents submitted
		i. Fill out verification checklist ii. Prepare daily report iii. Compile project quality control documents iv. Check final document completeness v. Submit documents to superior		<u>Attitude</u> i. Diligent in acknowledgment and the submission of forms	26	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			ii. Systematic in the filing of forms			

### Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.09 Prepare flowcharts 02.10 Prepare reports and instructions 02.11 Convey information and ideas to people 03.09 Manage and improve performance of individuals 03.10 Provide consultation and counselling 03.11 Monitor and evaluate performance of human resources 03.12 Provide coaching/on-the job training 03.13 Develop and maintain team harmony and resolve conflicts 03.14 Facilitate and coordinate teams and ideas 03.15 Liaise to achieve identified outcomes 03.16 Identify and assess client/customer needs 03.17 Identify staff training needs and facilitate access to training 04.06 Allocate work 04.07 Negotiate acceptance and support for objectives and strategies 05.01 Implement project/work plans 05.02 Inspect and monitor work done and/or in progress	1. Communication skills 2. Interpersonal skills 3. Multitasking and prioritising 4. Self-discipline 5. Teamwork

## Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Sample of Documents (Contract, Terms and Conditions, Specifications, Bill of Quantities, Construction Drawings)	As per required
2. Sample of Document (Material Technical Data Sheet, Material Safety Data Sheet, Material Labels)	As per required
3. Sample of Document (Request for Inspection, Work Completion, Handing Over, Time Card)	As per required
4. Samples of Documents (Acts)	1:20
5. Sample of Uncured Waterproofing	1:20
6. Surface Preparation Equipment	1:20
7. Samples of Properly Prepared Surface	1:20
8. Mixing Equipment	1:20
9. Application Equipment	1:20
10. Samples of Properly Cured Waterproofing	As per required
11. Stationery	As per required

## References

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14. Industrial Relation Act 1967

## CURRICULUM of COMPETENCY UNIT (CoCU)

<b>Sub Sector</b>		<b>CIVIL ENGINEERING</b>						
<b>Job Area</b>		<b>WATERPROOFING</b>						
<b>Competency Unit Title</b>		<b>WATERPROOFING MATERIAL HANDLING</b>						
<b>Learning Outcome</b>		<p>The person who is competent in this CU shall be able to ensure uninterrupted waterproofing materials supply, correct specification, minimizes material wastage, timely disposal of expired, surplus and used waterproofing materials. Upon completion of this competency unit, trainees will be able to: -</p> <ul style="list-style-type: none"> <li>• Check waterproofing material inventory</li> <li>• Prepare waterproofing stock requisition</li> <li>• Monitor material storage</li> <li>• Prepare stock inventory documents</li> <li>• Coordinate material disposal</li> </ul>						
<b>Competency Unit ID</b>		<b>BC-046-3:2013-C03</b>	<b>Level</b>	3	<b>Training Duration</b>	230 Hours	<b>Credit Hours</b>	23
<b>Work Activities</b>	<b>Related Knowledge</b>	<b>Related Skills</b>		<b>Attitude/Safety/Environmental</b>	<b>Training Hours</b>	<b>Delivery Mode</b>	<b>Assessment Criteria</b>	
1. Check waterproofing material inventory	i. Types of contract documents <ul style="list-style-type: none"> <li>• Specification</li> <li>• Bill of quantity</li> <li>• Construction drawing</li> </ul> ii. Contract documents information <ul style="list-style-type: none"> <li>• Waterproofing materials</li> </ul> iii. Methods of Communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> iv. Organisation structure <ul style="list-style-type: none"> <li>• Position</li> <li>• Task/</li> </ul>				15	Lecture	i. Waterproofing materials listed ii. Waterproofing material quantity availability confirmed iii. Correct internal usage requirements confirmed iv. Inventory listed	



Work Activities	Related Knowledge	Related Skills	Attitude/Safety/Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> <li>• Responsibility</li> </ul>	<ol style="list-style-type: none"> <li>i. Identify waterproofing materials</li> <li>ii. Ascertain waterproofing material availability</li> <li>iii. Obtain internal usage requirements</li> <li>iv. Update inventory</li> </ol>	<p><u>Attitude</u></p> <ol style="list-style-type: none"> <li>i. Thorough in extraction all information from documents</li> <li>ii. Precise in recording quantity</li> <li>iii. Tactful in obtaining usage requirements</li> </ol>	5	Demonstration & Observation	
2. Prepare waterproofing stock requisition	<ol style="list-style-type: none"> <li>i. Measurement <ul style="list-style-type: none"> <li>• Unit</li> <li>• Scaling</li> </ul> </li> <li>ii. Contract documents information <ul style="list-style-type: none"> <li>• Waterproofing location</li> <li>• Type of waterproofing materials</li> <li>• Area to waterproofed</li> </ul> </li> <li>iii. Waterproofing area calculation</li> <li>iv. Technical data sheet</li> </ol>			21	Lecture	<ol style="list-style-type: none"> <li>i. Location and size of waterproofing area listed</li> <li>ii. Quantity of waterproofing material acquired</li> <li>iii. Acquired waterproofing material order ensured</li> <li>iv. Completed requisition form forwarded</li> </ol>

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	information <ul style="list-style-type: none"> <li>• Coverage of waterproofing material</li> <li>• Packing of waterproofing material</li> </ul> v. Waterproofing material calculation vi. Methods of communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> vii. Organisation structure <ul style="list-style-type: none"> <li>• Position</li> <li>• Task/ Responsibility</li> </ul> viii. Standard Operating Procedure <ul style="list-style-type: none"> <li>• Material ordering</li> </ul>					
		i. Identify waterproofing area ii. Measure waterproofing area iii. Calculate waterproofing material quantity iv. Determine waterproofing material order v. Prepare requisition form vi. Submit requisition form	<u>Attitude</u> i. Thorough in	28	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			extraction of all information from documents ii. Precise in measurement iii. Accurate in calculation			
3. Monitor material storage	i. Organisation structure <ul style="list-style-type: none"> <li>• Position</li> <li>• Task/ Responsibility</li> </ul> ii. Methods of communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> iii. Technical data sheet information <ul style="list-style-type: none"> <li>• Storage of waterproofing material</li> <li>• Coverage of waterproofing material</li> </ul> iv. Material safety data sheet (MSDS) information <ul style="list-style-type: none"> <li>• Storage condition</li> <li>• Hazard</li> </ul> v. Types of store <ul style="list-style-type: none"> <li>• Material</li> <li>• Size</li> <li>• Condition</li> <li>• Accessibility</li> </ul>			23	Lecture	i. Storage criteria specified ii. Size and location of storage area identified iii. Daily needs and supply quantified iv. Material deliveries schedule produced v. Material delivery order form endorsed vi. Material storage activities reported vii. Operating hours, procedure and location of store conveyed to

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	vi. Measurement <ul style="list-style-type: none"> <li>• Unit</li> <li>• Techniques</li> <li>• Equipment</li> </ul> vii. Labour <ul style="list-style-type: none"> <li>• Manpower availability</li> <li>• Manpower performance</li> </ul> viii. Methods of communication <ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> </ul> ix. Moving equipment <ul style="list-style-type: none"> <li>• Types</li> <li>• Limitations</li> <li>• Advantages</li> </ul> x. Standard Operating Procedure <ul style="list-style-type: none"> <li>• Material acceptance</li> <li>• Store Access</li> <li>• Ergonomic material handling</li> </ul>					waterproofing applicator
		i. Obtain storage criteria ii. Check storage area availability iii. Estimate daily needs and supply iv. Schedule material deliveries v. Accept material delivery vi. Supervise material		95	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
		storage activities vii. Notify store operation	<u>Attitude</u> i. Handle document with care ii. Analytical in obtaining storage criteria iii. Resourceful in indentifying site storage availability and secure delivery iv. Creative in establishing the site storage area v. Meticulous in keeping stock vi. Organised in material supply vii. Accurate in counting and recording viii. Efficient in manpower handling supervision ix. Proactive in access assignment  <u>Safety</u> i. Awareness of material hazard			

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			ii. Safety conscious in establishing the site storage area			
4. Prepare stock inventory documents	i. Documentation <ul style="list-style-type: none"> <li>• Type of filling</li> <li>• Filing</li> </ul> ii. Standard Operating Procedure <ul style="list-style-type: none"> <li>• Receiving goods</li> <li>• Removal of goods</li> <li>• Stock inventory</li> </ul>			3	Lecture	i. Delivery order documented ii. Material removal checklist filled out and signed iii. Waterproofing material quantity utilisation quantified
		i. Compile delivery order ii. Record waterproofing material removal iii. Determine waterproofing material quantity utilisation iv. Update stock inventory documents	<u>Attitude</u> i. Meticulous in record keeping	12	Demonstration & Observation	iv. Updated stock inventory documented
5. Coordinate material disposal	i. Labour <ul style="list-style-type: none"> <li>• Manpower availability</li> <li>• Manpower performance</li> </ul> ii. Material safety data sheet (MSDS) information <ul style="list-style-type: none"> <li>• Storage condition</li> <li>• Hazard</li> </ul> iii. Record keeping			8	Lecture	i. Waste storage area identified ii. Waste collection by waterproofing applicator scheduled iii. Waterproofing waste quantified iv. Waste disposal

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
		<ul style="list-style-type: none"> <li>i. Establish waste collection area</li> <li>ii. Co-ordinate waste collection for disposal</li> <li>iii. Estimate waterproofing waste</li> <li>iv. Schedule waste disposal</li> <li>v. Record waste disposal</li> </ul>	<p><u>Attitude</u></p> <ul style="list-style-type: none"> <li>i. Diligent in collecting waste</li> <li>ii. Meticulous in record keeping</li> </ul> <p><u>Safety</u></p> <ul style="list-style-type: none"> <li>i. Safety conscious in establishing the waste storage area and waste disposal works</li> </ul> <p><u>Environment</u></p> <ul style="list-style-type: none"> <li>i. Adhere to OSHA in disposing of materials</li> </ul>	20	Demonstration & Observation	<ul style="list-style-type: none"> <li>schedule by approved and certified contractor submitted</li> <li>v. Waste disposal operation documented</li> </ul>

## Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.09 Prepare flowcharts 02.10 Prepare reports and instructions 02.11 Convey information and ideas to people 03.09 Manage and improve performance of individuals 03.10 Provide consultation and counselling 03.11 Monitor and evaluate performance of human resources 03.12 Provide coaching/on-the job training 03.13 Develop and maintain team harmony and resolve conflicts 03.14 Facilitate and coordinate teams and ideas 03.15 Liaise to achieve identified outcomes 03.16 Identify and assess client/customer needs 03.17 Identify staff training needs and facilitate access to training 04.06 Allocate work 04.07 Negotiate acceptance and support for objectives and strategies 05.01 Implement project/work plans 05.02 Inspect and monitor work done and/or in progress	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

## Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Temporary Store Erection Material and Equipment 2. Measuring Equipment 3. Containers and Rolls 4. Trolley 5. Wheel-barrow 6. Site Mock-up 7. Sample of Document (Contract, Terms and Conditions, Specifications, Bill of Quantities, Construction Drawings)	1:5 1:20 1:10 1:10 1:10 1:20 As per required



8. Sample of Document (Material Technical Data Sheet, Material Safety Data Sheet)	As per required
9. Samples of Documents (Acts)	As per required
10. Samples of Documents (Internal)	As per required
11. Stationery	As per required

## References

<b>REFERENCES</b>	
<ol style="list-style-type: none"> <li>1. Kubal, M. T, 2000. Construction waterproofing handbook, New York: McGraw-Hill, ISBN: 0071489738</li> <li>2. Perkins P. H, 1997. Repair, protection and waterproofing of concrete structures, New York: E &amp; FN Spon. ISBN: 0419202803</li> <li>3. Myron H. L, 1911. Modern methods of waterproofing concrete and other structures, The Norman W. Henley publishing company,</li> <li>4. Tyler G. Hicks, 2010. Civil Engineering Formulas, Second Edition, McGraw-Hill: New York, Tyler G. Hicks. ISBN:9780071614696</li> <li>5. Bojidar Y, 2007. Bridge management, Wiley. ISBN: 0471691623</li> <li>6. Charles S. H, 2008. Concrete Inspection, ISBN: 05597734980</li> <li>7. John E. Traister, 1997. Home Inspection Handbook, Craftsman Book Company. ISBN: 1572180463</li> <li>8. Joseph Ross, 2010. Waterproofing Engineering: For Engineers, Architects, Builders, Roofers, and Waterproofers (1919) (Reprint), Kessinger Publishing. ISBN: 1169793282,</li> <li>9. Justin H, Charles W. G, 1999. Manual of Below-Grade Waterproofing Systems, John Wiley and Sons. ISBN: 0471377309</li> <li>10. Myer K, 2009. Environmentally Conscious Materials Handling, John Wiley &amp; Sons. ISBN: 0470170700</li> <li>11. Occupational Health and Safety Act 1994</li> <li>12. Transport Act 2012</li> <li>13. Employment Act 1955</li> <li>14. Industrial Relation Act 1967</li> </ol>	

## CURRICULUM of COMPETENCY UNIT (CoCU)

<b>Sub Sector</b>		<b>CIVIL ENGINEERING</b>						
<b>Job Area</b>		<b>WATERPROOFING</b>						
<b>Competency Unit Title</b>		<b>WATERPROOFING SUPERVISORY FUNCTION</b>						
<b>Learning Outcome</b>		<p>The person who is competent in this CU shall be able to ensure quality waterproofing works. Upon completion of this competency unit, trainees will be able to: -</p> <ul style="list-style-type: none"> <li>• Schedule project resources</li> <li>• Coordinate project activities</li> <li>• Monitor staff competencies</li> </ul>						
<b>Competency Unit ID</b>		<b>BC-046-3:2013-E01</b>	<b>Level</b>	3	<b>Training Duration</b>	200 Hours	<b>Credit Hours</b>	20
<b>Work Activities</b>	<b>Related Knowledge</b>	<b>Related Skills</b>	<b>Attitude/Safety/Environmental</b>	<b>Training Hours</b>	<b>Delivery Mode</b>	<b>Assessment Criteria</b>		
1. Schedule project resources	i. Types of contract documents <ul style="list-style-type: none"> <li>• Terms of contract</li> <li>• Specification</li> <li>• Bill of quantity</li> <li>• Construction drawing</li> </ul> ii. Contract documents information <ul style="list-style-type: none"> <li>• Waterproofing location</li> <li>• Types of waterproofing materials</li> <li>• Timeline and completion time frame</li> </ul> iii. Waterproofing systems <ul style="list-style-type: none"> <li>• Classifications</li> <li>• Materials</li> </ul>			23	Lecture	i. Construction requirements as stipulated in contract document presented ii. Waterproofing tools, equipment and materials listed iii. Workforce strength and competencies listed iv. Task assignment and resource allocation chart presented		

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> <li>• Performance standard specification</li> <li>• Tools requirements</li> <li>• Application specifications</li> </ul> iv. Knowledge of quantity and quality of workers <ul style="list-style-type: none"> <li>• Job description</li> <li>• Worker specification</li> <li>• Gap and training needs</li> </ul> v. Task assignment and resource allocation					
		i. Determine construction requirements ii. Determine waterproofing equipment, tools and materials iii. Identify waterproofing workforce requirements iv. Produce task assignment and resource allocation chart	<u>Attitude</u> i. Thorough in interpreting client requirements ii. Knowledgeable in product details	50	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p>and performance</p> <p>iii. Systematic in documentation</p> <p>iv. Meticulous in information extraction and compilation</p> <p><u>Environment</u></p> <p>i. Adherence to construction related statutory body's s and health rules and regulations</p>			
2. Coordinate project activities	<p>i. Project timeline</p> <ul style="list-style-type: none"> <li>• Overall</li> <li>• Waterproofing</li> </ul> <p>ii. Technical and safety requirements</p> <ul style="list-style-type: none"> <li>• Overall</li> <li>• Waterproofing</li> </ul> <p>iii. Tools and equipments</p> <ul style="list-style-type: none"> <li>• Stock list</li> <li>• Inspection checklist</li> <li>• Servicing and maintenance schedule</li> </ul> <p>iv. Work delivery</p> <ul style="list-style-type: none"> <li>• Measurement</li> <li>• Performance</li> <li>• Recording</li> </ul> <p>v. Site safety requirements</p> <ul style="list-style-type: none"> <li>• Overall</li> </ul>			23	Lecture	<p>i. Waterproofing applicators work instruction issued</p> <p>ii. Briefing session conducted</p> <p>iii. Equipment conditions and availability checklist filled out</p> <p>iv. Work progress report produced</p> <p>v. Waterproofing construction site safety checklist filled and confirmed</p>

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	<ul style="list-style-type: none"> <li>• Waterproofing</li> <li>vi. Oral and written communication of problems, solutions and progress               <ul style="list-style-type: none"> <li>• With managerial and technical personnel</li> <li>• With workers</li> <li>• With other contracting parties</li> </ul> </li> <li>vii. Progress reporting to               <ul style="list-style-type: none"> <li>• Managerial and technical personnel</li> <li>• Clients</li> </ul> </li> </ul>					<ul style="list-style-type: none"> <li>vi. Problems and proposed solutions reported to managerial or technical personnel</li> <li>vii. Waterproofing project timeline observed and complied</li> </ul>
		<ul style="list-style-type: none"> <li>i. Assign waterproofing applicators</li> <li>ii. Brief applicators on technical and safety requirements</li> <li>iii. Inspect equipment conditions and availability</li> <li>iv. Examine work progress</li> <li>v. Verify waterproofing construction site safety</li> <li>vi. Communicate waterproofing applicators construction problems to managerial or technical personnel</li> <li>vii. Identify solutions to waterproofing</li> </ul>		50	Demonstration & Observation	

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
		applicators and construction problems viii. Monitor work progress	<u>Attitude</u> i. Diplomatic in resolving worker conflicts ii. Responsible for maintaining order among workers iii. Resourceful in handling hiccups and no-shows iv. Clear, effective and convincing in communicating laterally and vertically v. Factual in reporting progress  <u>Environment</u> i. Environmentally conscious in using raw materials and natural resources and minimising adverse impacts on workers and environments			

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Monitor staff competencies	i. Workers performance <ul style="list-style-type: none"> <li>• Key Performance Indicators(KPI)</li> <li>• Performance management</li> <li>• Performance appraisal</li> <li>• Performance review</li> <li>• Performance improvement</li> <li>• Training and refresher training</li> <li>• Competency assessment</li> </ul>			14	Lecture	i. Key Performance Indicators produced ii. KPIs conveyed iii. Applicators appraisal reports produced iv. Applicators performance assessment report filled out v. On-job training content and schedule produced
		i. Develop Key Performance Indicators (KPI) ii. Communicate KPIs to waterproofing applicators iii. Prepare applicators appraisal reports iv. Review applicators performance v. Discuss and record improvement areas vi. Prepare on-the-job training content and schedules vii. Arrange trainers for training applicators viii. Record on-the-job training completion verification		40	Demonstration & Observation	vi. On-the-job placement for applicators assigned vii. On-the-job training completion verified

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			<p><u>Attitude</u></p> <ul style="list-style-type: none"> <li>i. Accountable for workers' performance impact on deliverable quality</li> <li>ii. Result oriented in managing worker performance</li> <li>iii. Observant in reading situations, identifying low performers to put on trainings and high performers to reward</li> </ul> <p><u>Safety</u></p> <ul style="list-style-type: none"> <li>i. Cost and safety conscious in optimising resources and maximising output</li> </ul>			



## Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate and process information 01.08 Utilise spreadsheets applications to locate and process information 02.09 Prepare flowcharts 02.10 Prepare reports and instructions 02.11 Convey information and ideas to people 03.09 Manage and improve performance of individuals 03.10 Provide consultation and counselling 03.11 Monitor and evaluate performance of human resources 03.12 Provide coaching/on-the job training 03.13 Develop and maintain team harmony and resolve conflicts 03.14 Facilitate and coordinate teams and ideas 03.15 Liaise to achieve identified outcomes 03.16 Identify and assess client/customer needs 03.17 Identify staff training needs and facilitate access to training 04.06 Allocate work 04.07 Negotiate acceptance and support for objectives and strategies 05.01 Implement project/work plans 05.02 Inspect and monitor work done and/or in progress	1. Communication skills 2. Interpersonal skills 3. Multitasking and prioritising 4. Self-discipline 5. Teamwork

## Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Sample of Documents (Contract Documents, Construction Drawing, Bill of Quantity) 2. Sample of Document (Material Technical Data Sheet, Material Safety Data Sheet, Material Labels) 3. Sample of (Stock List, Inspection Checklist, Servicing and Maintenance Schedule ) 4. Sample of Performance Standard Specification(Sample of Stock List, Inspection Checklist, Servicing and Maintenance Schedule ) 5. Sample of Documents (Key Performance Indicators (KPI), Performance Appraisal, Performance Review, Training Programme, Competency Assessment) 6. Sample of Uncured Waterproofing 7. Surface Preparation Equipment	As per required As per required As per required As per required As per required 1:20 1:20

8. Samples of Properly Prepared Surface	1:20
9. Mixing Equipment	1:20
10. Application Equipment	1:20
11. Samples of Properly Cured Waterproofing	1:20
12. Stationery	As per required

## References

<p><b>REFERENCES</b></p> <ol style="list-style-type: none"> <li>1. Kubal, M. T, 2000. Construction waterproofing handbook, New York: McGraw-Hill, ISBN: 0071489738</li> <li>2. Perkins P. H, 1997. Repair, protection and waterproofing of concrete structures, New York: E &amp; FN Spon. ISBN: 0419202803</li> <li>3. Myron H. L, 1911. Modern methods of waterproofing concrete and other structures, The Norman W. Henley publishing company,</li> <li>4. Tyler G. Hicks, 2010. Civil Engineering Formulas, Second Edition, McGraw-Hill: New York, Tyler G. Hicks. ISBN: 9780071614696</li> <li>5. Bojidar Y, 2007. Bridge management, Wiley. ISBN: 0471691623</li> <li>6. Charles S. H, 2008. Concrete Inspection, ISBN: 05597734980</li> <li>7. John E. Traister, 1997. Home Inspection Handbook, Craftsman Book Company. ISBN: 1572180463</li> <li>8. Joseph Ross, 2010. Waterproofing Engineering: For Engineers, Architects, Builders, Roofers, and Waterproofers (1919) (Reprint), Kessinger Publishing. ISBN: 1169793282,</li> <li>9. Justin H, Charles W. G, 1999. Manual of Below-Grade Waterproofing Systems, John Wiley and Sons. ISBN: 0471377309</li> <li>10. Myer K, 2009. Environmentally Conscious Materials Handling, John Wiley &amp; Sons. ISBN: 0470170700</li> <li>11. Occupational Health and Safety Act 1994</li> <li>12. Transport Act 2012</li> <li>13. Employment Act 1955</li> <li>14. Industrial Relation Act 1967</li> </ol>
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## Training Hour Summary

<b>SECTOR : BUILDING AND CONSTRUCTION</b>		
<b>SUB SECTOR : CIVIL ENGINEERING</b>		
<b>JOB AREA : WATERPROOFING</b>		
<b>NOSS TITLE : WATERPROOFING WORKS SUPERVISION</b>		
<b>JOB LEVEL : THREE (3)</b>		
CU ID	Competency Unit	Training Hour
BC-046-3:2013-C01	WATERPROOFING TESTING & COMMISSIONING	200
BC-046-3:2013-C02	WATERPROOFING VERIFICATION WORKS	200
BC-046-3:2013-C03	WATERPROOFING MATERIAL HANDLING	230
WATERPROOFING SUPERVISORY FUNCTIONS	WATERPROOFING SUPERVISORY FUNCTIONS	200
<b>Total Training Program Hours</b>		<b>830</b>

