



**NATIONAL COMPETENCY STANDARDS  
FOR  
BAILEY BRIDGE TECHNICIAN  
(NC2)**

**Department of Occupational Standards  
Ministry of Labour and Human Resources  
Thimphu Bhutan  
(July 2020)**



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## **FOREWORD**

The Department of Occupational Standards of the Ministry of Labour and Human Resources is pleased to present the revised version of National Competency Standards (NCSs) for Bailey Bridge Technician. The standards represent the fruits of hard work and invaluable experiences gained by the department since its establishment in the latter half of 2003. The main aim of developing NCS is to set up a well-defined nationally recognized Vocational Qualifications System that will help set a benchmark for the Technical Vocational Education and Training (TVET) System in our country aligned to international best practices.

NCS is one of the base pillars in the Bhutan Vocational Qualifications Framework (BVQF) and is the first step in its implementation. The NCS are developed and revised to ensure that employees or vocational graduates possess and acquire the desired competencies required by industries and employers. In order to ensure this close match in supply and demand of competencies, NCS have been developed and revised in close consultation and partnership with industry experts and validated by the Technical Advisory Committees of the concerned economic sectors.

A vocational education and training system based on NCS shall ensure that delivered training is of a high quality and relevant to the needs of the labour market. As a result, future TVET graduates will be better equipped to meet the need and expectations of industries and employers. This positive impact on the employability of TVET graduates will enhance the reputation of vocational education and training and make it attractive to school leavers.

I gratefully acknowledge collaboration and the valuable contributions made by experts from industries during the consultation and validation processes of the standards. I look forward for continued engagement and participation of the industry and employers in the development of a quality assured demand driven TVET system and to build competent and productive national workforce that will contribute to the continued socio-economic progress of our country.

Director  
Department of Occupational Standards  
Ministry of Labour and Human Resource

## Acknowledgement

**Validation date** : 31/07/2020

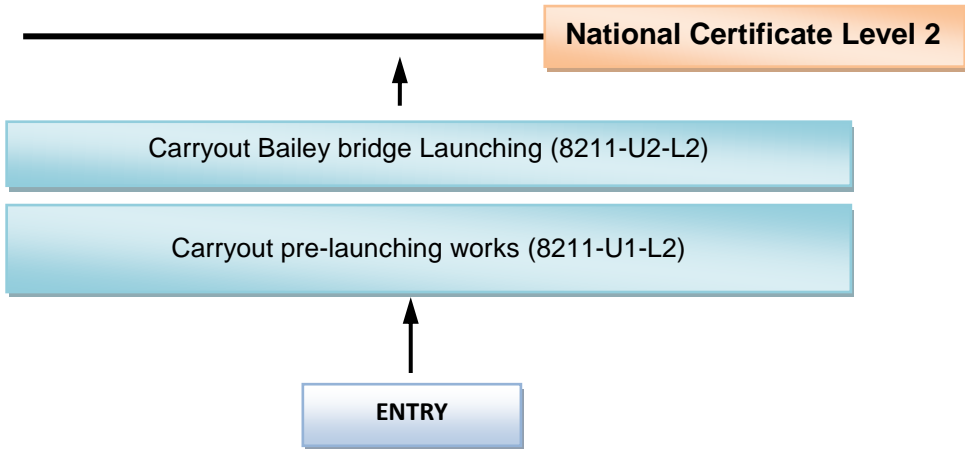
**Endorsement date:** 31/07/2020

**Date of Review** : 31/07/2023 (Max. 3 years)

### **Members involved in the development and validation of NCS:**

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## Packaging of Qualifications for Bailey Bridge Technician



## Overview of the National Competency Standards

UNIT TITLE	ELEMENTS OF COMPETENCE
1. Carryout pre-launching works	1. Perform pre-launching works 2. Prepare tools and equipment
2. Carryout Bailey Bridge Launching	1. Perform assembling of bailey bridge parts 2. Perform bailey bridge Launching



**UNIT TITLE:** Carryout Pre-launching works

**DESCRIPTOR :** This unit covers the competencies required to carry out pre-launching works following standard procedures and ensuring workplace safety at all times.

**CODE :** 8211-U1-L2

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1 Perform pre-launching works	1.1 Use <b>Personal Protective Equipment</b> as per the job requirement following standard procedures 1.2 Perform <b>site inspection</b> as per the job requirement following standard procedures 1.3 Collect <b>bridge parts</b> as per the job requirement following standard procedures 1.4 Load the bridge parts in sequence as per the job requirement following standard procedures 1.5 Unload the bridge parts in sequence as per the job requirement following standard procedures
2 Prepare tools and equipment	2.1 Identify the types of <b>tools and equipment</b> as per the job following standard procedures 2.2 Collect tools and equipment as per the job requirement following standard procedures 2.3 <b>Service</b> tools and equipment as per the job requirement following standard procedures

## RANGE STATEMENT

### Personal Protective Equipment may include but not limited to:

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Helmet</li><li>• Safety belt</li><li>• Gloves</li></ul> | <ul style="list-style-type: none"><li>• Safety shoes</li><li>• Working dress</li></ul> |
|---|--|

### Site inspection may include but not limited to:

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Approach road level</li><li>• Camping sites</li></ul> | <ul style="list-style-type: none"><li>• Launching space</li></ul> |
|---|---|

### Bridge parts may include but not limited to:

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Panel</li><li>• Transom</li><li>• Reinforcement</li></ul> | <ul style="list-style-type: none"><li>• Sway brace</li><li>• Raker</li></ul> |
|---|--|

### Tools and Equipment may include but not limited to:

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Plain roller</li><li>• Rocking roller</li><li>• Wooden block</li><li>• Crow bar</li><li>• Launching nose</li></ul> | <ul style="list-style-type: none"><li>• Wrench</li><li>• Sledge hammer</li><li>• Hydraulic jack</li><li>• Max puller</li><li>• Lever block</li></ul> |
|--|--|

<ul style="list-style-type: none"> <li>• Spanner</li> <li>• Water level</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring tape</li> </ul>
<p><b>Services may include but not limited to:</b></p>	
<ul style="list-style-type: none"> <li>• Greasing</li> <li>• Replace</li> </ul>	<ul style="list-style-type: none"> <li>• Repair</li> <li>• Refer for welding</li> </ul>
<p><b>Critical Aspects:</b></p>	
<ul style="list-style-type: none"> <li>• Follow occupational health and safety procedures</li> <li>• Perform site inspection as per the job requirement following standard procedures</li> <li>• Identify the types of tools and equipment as per the job following standard procedures</li> </ul>	

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> <li>• Ethics and integrity</li> <li>• Occupational Health and safety</li> <li>• Basic First Aid</li> <li>• Parts of bailey bridge and its function</li> <li>• Load calculation</li> <li>• Bridge alignment</li> </ul>	<ul style="list-style-type: none"> <li>• Communication</li> <li>• Team work</li> <li>• Planning</li> <li>• Time management</li> <li>• Negotiation</li> <li>• Innovation</li> </ul>

**UNIT TITLE:** Carryout Bailey bridge Launching

**DESCRIPTOR :** This unit covers the competencies required to carry out bailey bridge launching works following standard procedures and ensuring workplace safety at all times.

**CODE :** 8211-U2-L2

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Perform assembling of bailey bridge parts	1.1 Use <b>Personal Protective Equipment</b> as per the job requirement following standard procedures 1.2 Assemble the <b>reinforcement</b> as per the job requirement following standard procedures 1.3 Fix bracing frame following standard procedures
2. Perform bailey bridge Launching	2.1 Check alignment of bridge abutment as per the job requirement following standard procedures 2.2 Arrange the base plate as per the job requirement following standard procedures 2.3 Install bearings and rocking roller as per the job requirement 2.4 Install plain roller/wooden block as per the job requirement 2.5 Install panel as per the job requirement 2.6 Install transom as per the job requirement 2.7 Install launching nose as per the job requirement

	<p>2.8 Launch the bridge as per the job requirement</p> <p>2.9 Perform final inspection and take corrective action as per the job requirement following standard procedures</p>
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<b>RANGE STATEMENT</b>	
<b>Personal Protective Equipment may include but not limited to:</b>	
<ul style="list-style-type: none"> <li>• Helmet</li> <li>• Safety belt</li> <li>• Gloves</li> </ul>	<ul style="list-style-type: none"> <li>• Safety shoes</li> <li>• Working dress</li> </ul>
<b>Reinforcement may include but not limited to:</b>	
<ul style="list-style-type: none"> <li>• SSR(Single Single Reinforcement)</li> <li>• DSR (Double Single Reinforcement)</li> </ul>	<ul style="list-style-type: none"> <li>• TSR (Triple Single Reinforcement)</li> <li>• DDR (Double Double Reinforcement)</li> </ul>
<b>Critical Aspects:</b>	
<ul style="list-style-type: none"> <li>• Follow occupational health and safety procedures</li> <li>• Perform loading based on (force x distance) during launching process following standard procedures</li> <li>• Perform final inspection and take corrective action as per the job requirement following standard procedures</li> </ul>	

<b>UNDERPINNING KNOWLEDGE</b>	<b>UNDERPINNING SKILLS</b>
<ul style="list-style-type: none"><li>• Ethics and integrity</li><li>• Occupational Health and safety</li><li>• Basic First Aid</li><li>• Bridge launching procedures</li><li>• Types of bailey bridge</li><li>• Load capacity of bridge</li><li>• Launching space requirement</li><li>• Calculation of counterweight</li></ul>	<ul style="list-style-type: none"><li>• Communication</li><li>• Team work</li><li>• Planning</li><li>• Time management</li><li>• Negotiation</li><li>• Innovation</li></ul>

## **Annexure**

### **1.1 National Competency Standards (NCS)**

The National Competency Standards specify the skill, knowledge and attitude applied to a particular occupation. Standards also specify the standards or criteria of performance of a competent worker and the various contexts in which work may take place. Standards provide explicit advice to assessors regarding the skill and knowledge to be demonstrated by candidates seeking formal recognition either following training or through work experience.

### **1.2 Purpose of National Competency Standards**

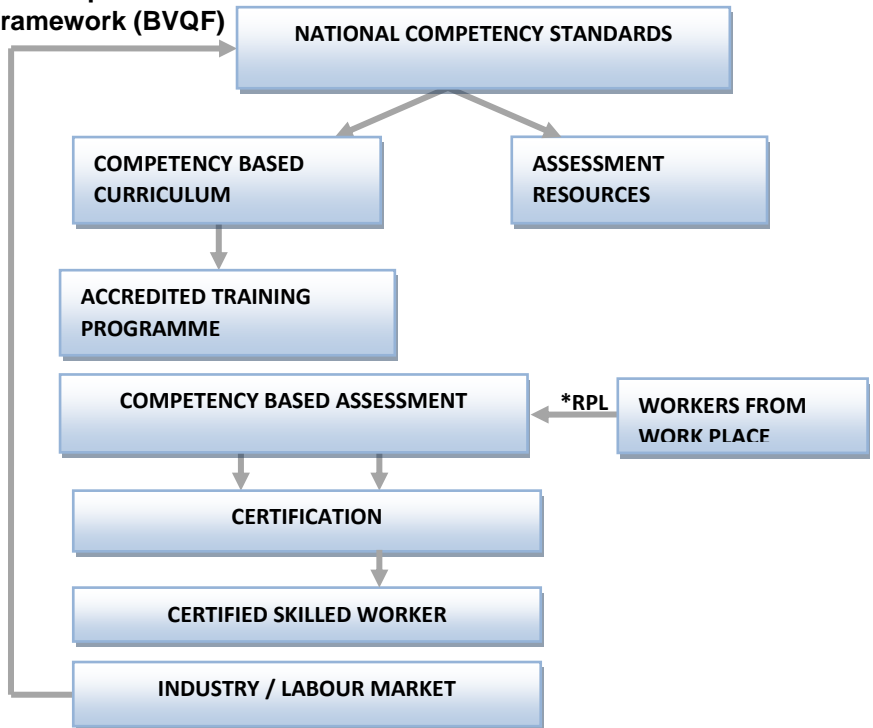
National Competency Standards serve a number of purposes including:

- Providing advice to curriculum developers about the competencies to be included in curriculum.
- Providing specifications to assessment resource developers about the competencies within an occupation to be demonstrated by candidates.
- Providing advice to industry/employers about job functions, which in turn can be used for the development of job descriptions, performance appraisal systems and work flow analysis.

### 1.3 Bhutan Vocational Qualifications Framework (BVQF)

Bhutan Vocational Qualifications Framework is an agreed system of Assessing, Certifying and Monitoring nationally recognized qualifications for all learning in the TVET sector against national competency standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

### 1.4 Components of the Bhutan Vocational Qualifications Framework (BVQF)



\* RPL = Recognition of Prior Learning



## 1.5 BVQF Levels

The Bhutan Vocational Qualifications Framework has three levels classified based on the competency of the skilled workers. The three levels are:

- National Certificate Level 3 (NC III)
- National Certificate Level 2 (NC II)
- National Certificate Level 1 (NC I)

### BVQF Level Descriptors

The qualification levels are decided based on level descriptors. The detail of the qualification level descriptor is as follows:

#### National Certificate Level 1

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"><li>• Are narrow in range.</li><li>• Are established and familiar.</li><li>• Offer a clear choice of routine responses.</li><li>• Involve some prioritizing of tasks from known solutions.</li></ul>	<ul style="list-style-type: none"><li>• Basic operational knowledge and skill.</li><li>• Utilization of basic available information.</li><li>• Known solutions to familiar problems.</li><li>• Little generation of new ideas.</li></ul>	<ul style="list-style-type: none"><li>• In directed activity.</li><li>• Under general supervision and quality control.</li><li>• With some responsibility for quantity and quality.</li><li>• With no responsibility for guiding others.</li></ul>

## National Certificate Level 2

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> <li>• Require a range of well-developed skills.</li> <li>• Offer a significant choice of procedures requiring prioritization.</li> <li>• Are employed within a range of familiar context.</li> </ul>	<ul style="list-style-type: none"> <li>• Some relevant theoretical knowledge.</li> <li>• Interpretation of available information.</li> <li>• Discretion and judgments.</li> <li>• A range of known responses to familiar problems</li> </ul>	<ul style="list-style-type: none"> <li>• In directed activity with some autonomy.</li> <li>• Under general supervision and quality checking.</li> <li>• With significant responsibility for the quantity and quality of output.</li> <li>• With some possible responsibility for the output of others.</li> </ul>

## National Certificate Level 3

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> <li>• Requires a wide range of technical or scholastic skills.</li> <li>• Offer a considerable choice of</li> </ul>	<ul style="list-style-type: none"> <li>• A broad knowledge base which incorporates some theoretical concepts.</li> <li>• Analytical</li> </ul>	<ul style="list-style-type: none"> <li>• In self-directed activity.</li> <li>• Under broad guidance and evaluation.</li> <li>• With complete responsibility for quantity and</li> </ul>

<p>procedures requiring prioritization to achieve optimum outcomes.</p> <ul style="list-style-type: none"> <li>• Are employed in a variety of familiar and unfamiliar contexts.</li> </ul>	<p>interpretation of information.</p> <ul style="list-style-type: none"> <li>• Informed judgment.</li> <li>• A range of sometimes innovative responses to concrete but often unfamiliar problems.</li> </ul>	<p>quality of output.</p> <ul style="list-style-type: none"> <li>• With possible responsibility for the output of others.</li> </ul>
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## 1.6 PURPOSE

This qualification is designed for people interested in a career as a Bailey Bridge Technician at the Certificate level. It covers the essential knowledge and skills required for people working at the site.

It provides industry specific skills and demands a level of performance that will enable new recruits to the industry to be immediately productive.

## 1.7 CODING USED FOR NATIONAL COMPETENCY STANDARDS

The coding and classification system developed in Bhutan is logical, easy to use, and also aligned with international best practises. The Bhutanese coding and classification system is based on the International Standard Classification of Occupations, 2008 (ISCO-08) developed by the International Labour Organisation (ILO).

The coding of the National competency standards forms the basis of the identification code for the Vocational Education and Training Management Information System (VET – MIS)

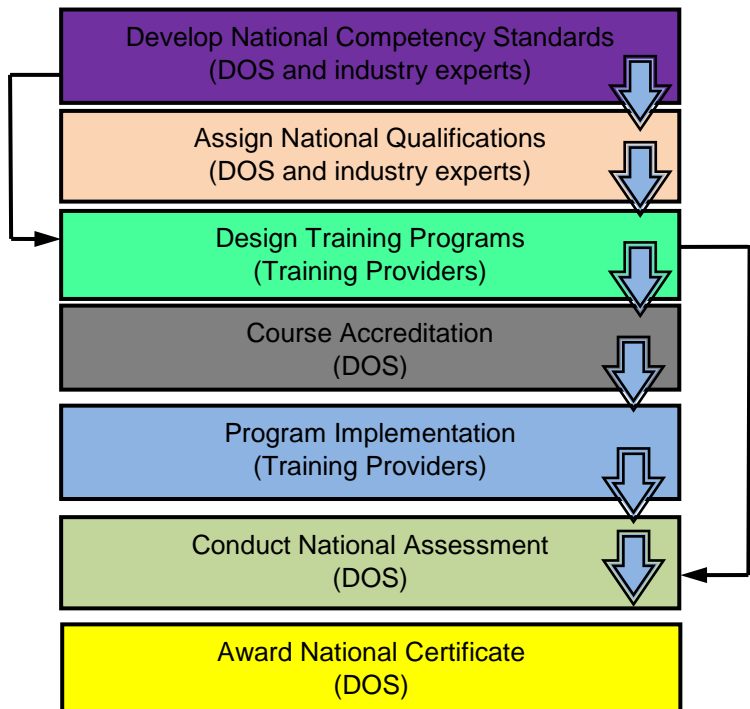
both in terms of economic sector identification and that of the individual standard.

### **Coding the individual national competency standards**

Coding the individual skills standard has a multiple purpose:

- to identify the level,
- to identify to which module the standard belongs,
- to identify in which order the standard is clustered within that module.

### **Implementation and operational procedures for National Competency Standards (NCS)**



## **1.8 ASSESSMENT GUIDE**

### **Form of assessments**

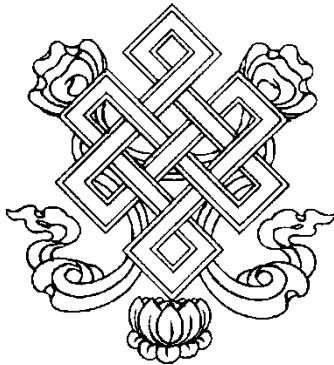
- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

### **Assessment context**

- Competency may be assessed in the actual work place or in a simulated workplace setting.

### **Assessment condition**

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.



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