Trenchless Technology Operators Vocational Qualification Project

TRADE SKILL DEVELOPMENT
Competency level 1

COMPETENCE
TTOVQC 2 Microtunneling & Pipe Jacking OPERATOR

BASIC COMPETENCE
BC 1.1 BASIC OPERATOR

Developed by

Indian Society for Trenchless Technology
908, Hemkunt Chambers,
89, Nehru Place, New Delhi 110 019
Ph. (11) 41617862 , Fax (011) 416127863

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Trenchless Technology Workers Vocational Qualification Project

Trade (Skill Development) At Competency level – 1

COMPETENCE:	TTWVQC 2	Microtunneling & Pipe Jacking OPERATOR
BASIC COMPETENCE	BC 2.1	BASIC OPERATOR

Background

Microtunneling & Pipe Jacking technique provide state-of-art solutions for developing subsurface piped networks in critical grades and alignment at several inaccessible locations where open cut pipe laying is not possible. The course to provide training to persons desirous of operating these machines, the MT-PJ Vocational Qualification Course (MTPJ VQC) sets out certain standards for the trained professionals. These sets of vocational qualification standards define the minimum qualifications one needs to possess in order to handle pipe installation successfully. A competent operator after his training needs to display the minimum qualities as defined hereunder.

PRIOR ACHIEVEMENT EVIDENCE

Trainees undertaking this course need to have work experience of 5 years as an assistant machine operator or should have a diploma in Civil/Electrical/Mechanical Engineering from any recognized institution.

PERFORMANCE STANDARD

Workers completing the course shall be able to display competence in the following sections of Microtunneling & Pipe Jacking works:

General

- Ability to consider the most important basics of jobsite preparation when planning the complete project.
- Assemble and set up the tunneling unit correctly under varying job site conditions.
- Select the suitable tunneling method corresponding with the soil conditions.

Plan and prepare

- Work instructions, including plans, specifications, quality requirements and operational details are obtained, confirmed and applied to the allotted task
- Safety requirements are obtained from the site safety plan and organisational policies and procedures, confirmed and applied to the allotted task
- Signage requirements are identified and obtained from the project traffic management plan and implemented
- Plant, tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported
- Environmental protection requirements are identified from the project environmental management plan, confirmed and applied to the allotted task

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Prepare for boring operations

- Location, alignment direction, level and grade of bore is determined from drawings and specifications
- Above and below ground survey instruments are used to determine the bore pathway for underground vertical and horizontal alignment
- Visual geological investigation of alignment is conducted to determine the differing soil types and groundwater conditions
- Bore head and drilling fluid is selected for the strata
- Boring equipment is positioned, anchored/staked down in accordance with manufacturers' and/or site requirements

Conduct equipment checks

- Safety requirements are identified and applied in accordance with manufacturers' specifications
- Start-up, shut-down and communications procedures are carried out in accordance with manufacturers' and/or site specific requirements
- Equipment controls and functions, including implements or other attachments, anchors and/or stabilizing equipment are checked for serviceability, and faults reported
- Inspection and fault finding is conducted in accordance with manufacturers' specifications and/or site requirements
- Equipment maintenance tasks are carried out regularly in accordance with manufacturers' and/or site requirements
- Drive bore hole
- Launch and receiving pits are constructed to specifications to accommodate bore rig and tools
- Trench collapse prevention for launch and receiving pits are identified and implemented.
- Thrust wall is established to specific design in accordance with pipe size and soil characteristics
- Traverse line of pilot hole to receiving pit is determined in accordance with plans and specifications
- Traverse line of pilot hole to receiving pit is confirmed at specified distances
- Spoil is collected and disposed of in accordance with job specifications
- Augers are selected and attached to drilling machine in accordance with design specifications
- Casings/pipes are jacked through to receiving pit in compliance with design specifications
- Equipment is monitored for continuity of production in varied site conditions in accordance with standard work practices

Clean up

- Work area is cleared and materials disposed of or recycled in accordance with project environmental management plan
- Plant, tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturers'' recommendations and standard work practices
- Apply the drilling head location technique and its functions successfully.
- Select the backreaming technique in correspondence with the soil conditions and the pipes and to
- Carry out common maintenance and problem solving measurements independently.

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Critical aspects of evidence required to demonstrate competency	• Location, interpretation and application of relevant information, standards and specifications • Compliance with site safety plan, OH&S regulations and State/Territory legislation applicable to workplace operations • Compliance with organisational policies and procedures including quality requirements • Completion of at least 50 metres of microtunnelling and pipejacking to specifications • Safe and effective operational use of tools, plant and equipment • Communication and working effectively and safely with others
Specific knowledge required to achieve the performance criteria	• A knowledge of - Site and equipment safety requirements - Drilling fluids - Categories of horizontal directional drilling - Laser control equipment - Manual handling - Confined space entry - Electronic cable locating devices - Slinging procedures - Processes for interpreting engineering drawings - Equipment types, characteristics, technical capabilities and limitations - Operational, maintenance and basic diagnostic procedures - Site isolation and traffic control responsibilities and authorities

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- Materials Safety Data Sheets and materials handling methods
- Project quality requirements
- Civil construction terminology
- Microtunnelling and pipejacking
- JSA's/Safe work method statement

MINIMUM PERFORMANCE STANDARDS

While executing the tunneling operations, the operators need to display the following minimum qualifications:

1.1.1 Safety during work

1. General precautions necessary for safety of structure and operators;
2. Necessary Aids for safety are used without fail;

1.1.2 Read working drawings / Sketches and proceed with work

1. Given a set of drawings / sketch requirement of machine related tooling worked out and the scope of work understood;
2. The work is executed as per drawings / sketches;

1.1.3 Knowledge and use of equipment and tooling

1. Proper identification of equipment tools.
2. Proper parking/storage of equipment and tooling;
3. Proper use of consumables;
4. Proper use of tools.

1.1.4 Knowledge of machine operating procedure and sequence

1. Machine is properly connected to desired power points and all related accessories are connected properly.
2. Voltage, frequency, current potential, and polarity are checked.

1.1.5 Knowledge about defects, their remedy and acceptance limit

1. Identified the defects of machine.
2. Remedy to the defects is known.
3. Acceptance limit as per standard code is known.

PERFORMANCE EVIDENCE

1. Helmet, Hand Shields, Safety Goggles, Gloves etc. are used.
2. Operator's health is fit before he goes to job.

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3. The machine operator identified the proper tools for work.
4. The machine operator knows the use of specific tool.
5. For a set of approved bore plan drawings comprising type, size and location of all machine tools demonstrated for all requirements as per performance criteria.
6. The work is done as per demand of drawings.
7. Operator knows how to make ready machine for use.
8. Proper earthing is given.
9. Proper polarity is confirmed.
10. Loose connections are checked.
11. All the defects in different type of machine are clearly identified.
12. Possible remedy to the defects identified is given.
13. Variation allowed as per codes are very well known.

SUPPLEMENTARY (KNOWLEDGE) EVIDENCE

In addition to the prior achievement evidence a trainee needs to display the following supplementary knowledge evidence for the course completion and being permitted to operate the Microtunneling Machines independently:

1. Reading and writing in vernacular language.
2. Ability to conduct area and volume calculations.
3. Understanding about drilling fluid mix.
4. Understanding about different types of cuttings coming out of the drill holes and actions needed to avoid related accidents.
5. Possession of knowledge of various basic construction norms;
6. Possession of knowledge of basic electrical hazard prevention methods;
7. Awareness about basic operator's manual for Microtunneling machines required for site works.

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