

Tunnel Boring Machine (TBM) Operations Safety Inspection Checklist

Site / Project	_____	Address	_____
Inspector name	_____	Company	_____
Date	_____	Time	_____

Documentation aid only. Adapt this resource to the site, manufacturer instructions, and applicable local requirements. It does not replace a competent person, professional judgment, legal advice, or a required statutory form.

Inspection checklist

Gas Monitoring and Ventilation Systems

☐ Are all gas monitoring devices (CH ₄ , H ₂ S, CO, O ₂) calibrated within the last 30 days, with records available?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Are gas monitors positioned within 10 feet of the tunnel face and at regular intervals along the tunnel bore?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Is the ventilation system delivering the required airflow (CFM) to maintain gas concentrations below permissible exposure limits (PELs)? Verify with anemometer readings.	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Inspect ventilation ducts for damage (tears, punctures, collapses) and ensure proper sealing at joints. Repair or replace as needed.	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Verify the emergency ventilation system is functional and can be activated within 60 seconds. Conduct a drill.	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Are potential ignition sources (e.g., non-intrinsically safe electrical equipment) prohibited within 50 feet of areas where methane concentrations exceed 1%?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Is the air velocity at the tunnel face maintained at a minimum of 30 feet per minute to dilute and remove contaminants?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐ Confirm that the gas alarm system is audible and visible throughout the tunnel and that all personnel are trained on alarm response procedures.	☐ Pass	☐ Fail	☐ N/A	Notes: _____

☐	Verify continuous monitoring of oxygen levels to ensure adequate breathable air (19.5% - 23.5%).	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are gas monitoring records maintained and readily available for review, documenting gas levels and ventilation system performance?	☐ Pass	☐ Fail	☐ N/A	Notes: _____

Fire Prevention and Suppression

☐	Are appropriate fire extinguishers (Class A, B, C) readily accessible within 25 feet of potential fire hazards (e.g., welding areas, electrical panels, TBM cutter head)?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are fire extinguishers inspected monthly, with inspection tags indicating the last inspection date and condition?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are hot work permits required for all welding, cutting, and grinding activities, and are they properly completed and authorized?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are flammable liquids stored in approved containers and in designated, well-ventilated areas, away from ignition sources?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is the TBM equipped with a functional fire suppression system (e.g., automatic sprinkler system) that is regularly inspected and maintained?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are emergency egress routes clearly marked and unobstructed, with emergency lighting functional and tested weekly?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Verify the fire alarm system is functional and audible throughout the tunnel. Conduct a monthly test.	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are designated fire brigade members trained in fire suppression techniques and emergency response procedures?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is the tunnel free of combustible materials (e.g., wood scraps, oily rags) that could contribute to a fire?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are welding blankets or screens used to contain sparks and prevent fires during welding operations?	☐ Pass	☐ Fail	☐ N/A	Notes: _____

Conveyor and Rotating Equipment Safety

☐	Are all moving parts of conveyors (e.g., rollers, belts, pulleys) adequately guarded to prevent contact?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
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☐	Are emergency stop devices (e-stops) readily accessible along the entire length of the conveyor system and tested weekly?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are lockout/tagout procedures in place and followed for all maintenance and repair work on conveyors and rotating equipment?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Inspect conveyor belts for proper alignment and tracking. Adjust as needed to prevent material spillage and belt damage.	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are all rotating parts of machinery (e.g., pumps, motors, gearboxes) properly guarded to prevent contact?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are nip points on rotating equipment (e.g., belt and pulley interfaces) adequately guarded?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are maintenance records available for all conveyors and rotating equipment, documenting inspections, repairs, and lubrication schedules?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are warning signs posted near conveyors and rotating equipment, alerting personnel to potential hazards?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Does the conveyor system have overload protection to prevent material jams and potential equipment damage?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are belt cleaners installed and functioning properly to prevent material buildup on conveyor belts?	☐ Pass	☐ Fail	☐ N/A	Notes: _____

Segment Ring Installation Safety

☐	Are segment rings handled using appropriate lifting equipment (e.g., vacuum lifters, cranes) with certified lifting capacity?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is lifting equipment inspected daily before use, with records maintained of inspections and maintenance?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are slings inspected before each use for damage (e.g., cuts, abrasions, kinks) and removed from service if necessary?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are segment rings stored on stable, level surfaces to prevent tipping or collapse?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is a personnel exclusion zone established during segment ring lifting and installation operations?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is a clear communication system in place between the crane operator, signal person, and installation crew?	☐ Pass	☐ Fail	☐ N/A	Notes: _____

☐	Are workers installing segment rings using appropriate fall protection equipment (e.g., harnesses, lanyards, lifelines) when working at heights above 6 feet?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are workers trained to recognize and avoid pinch points during segment ring installation?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are workers using the correct tools for segment ring installation (e.g., alignment pins, hydraulic jacks)?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is a written segment ring installation procedure available and followed by the installation crew?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is adequate lighting provided in the segment ring installation area to ensure safe working conditions?	☐ Pass	☐ Fail	☐ N/A	Notes: _____

Hyperbaric Intervention (If Applicable)

☐	Is the hyperbaric chamber inspected daily for leaks, proper functioning of pressure controls, and communication systems?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are approved decompression tables readily available and followed during decompression procedures?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are all personnel involved in hyperbaric operations trained and certified in hyperbaric procedures and emergency response?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is a standby diver available and equipped to respond to emergencies during hyperbaric interventions?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is a reliable communication system in place between the hyperbaric chamber and the surface?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is medical support readily available for personnel undergoing hyperbaric interventions?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Are emergency procedures in place and practiced for hyperbaric incidents (e.g., rapid ascent, chamber fire)?	☐ Pass	☐ Fail	☐ N/A	Notes: _____
☐	Is the oxygen level within the hyperbaric chamber continuously monitored to prevent oxygen toxicity?	☐ Pass	☐ Fail	☐ N/A	Notes: _____

Findings

#	Item	Location	Severity	Action required
1				
2				
3				
4				
5				
6				
7				
8				

Signature

Inspector signature _____

Name _____

Date _____